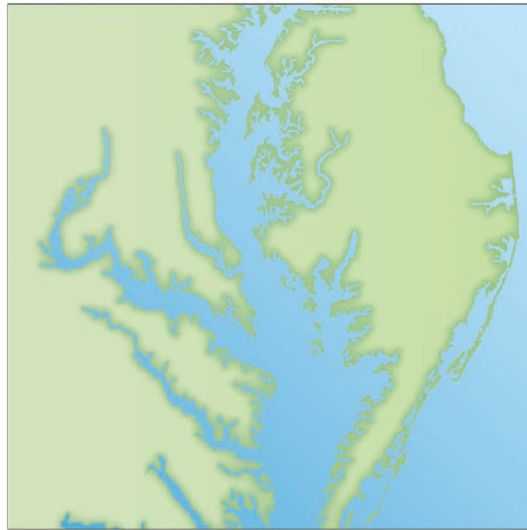


The Next Generation of Tools and Actions to Restore Water Quality in the Chesapeake Bay

A Revised Report Fulfilling Section 202a of Executive Order 13508

November 24, 2009

U.S. Environmental Protection Agency



Disclaimer

This document is the U.S. Environmental Protection Agency's (EPA's) revised report under Section 202a of Executive Order 13508 making recommendations to the Federal Leadership Committee (FLC) for the Chesapeake Bay for a strategy to define the next generation of tools and actions to restore water quality in the Chesapeake Bay and describe the changes to be made to regulations, programs, and policies to implement those actions. This revised document is published to supplement the FLC's publication of a *Draft Strategy for Protecting and Restoring the Chesapeake Bay* (issued November 9, 2009). This revised report includes recommendations that may change as the FLC's draft strategy is further refined based on public comments. This revised document is not a final agency action subject to judicial review; nor is it a rule. Nothing in this revised document is meant to, or in fact does, affect the substantive or legal rights of third parties or bind EPA. While this revised document reflects EPA's current thinking regarding recommendations to protect and restore the Chesapeake Bay, EPA reserves the discretion to modify the recommendations included in the report as the Agency works with the FLC to refine the draft strategy, or act in a manner different from this report, as appropriate.

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Abbreviations and Acronyms

AFO	animal feeding operation
CAA	Clean Air Act
CAFO	concentrated animal feeding operation
CAIR	Clean Air Interstate Rule
CFR	<i>Code of Federal Regulations</i>
CWA	Clean Water Act
CWSRF	Clean Water State Revolving Fund
CZARA	Coastal Zone Act Reauthorization Amendments
DNREC	Department of Natural Resources and Environmental Control
ENR	enhanced nutrient removal
EPA	U.S. Environmental Protection Agency
FLC	Federal Leadership Committee
MACT	maximum achievable control technology
MS4	municipal separate storm sewer system
NADP	National Atmospheric Deposition Program
NAEMS	National Air Emissions Monitoring Study
NH _x	reduced nitrogen
NMPs	Nutrient Management Plans
NOAA	National Oceanic and Atmospheric Administration
NO _x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NSPS	new source performance standards
PAH	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyls
POTW	publicly owned treatment works
RCRA	Resource Conservation and Recovery Act
RICE	reciprocating internal combustion engines
SRF	State Revolving Fund
TMDL	Total Maximum Daily Load
TN	total nitrogen
TP	total phosphorus
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
WLA	wasteload allocation

Executive Summary

The Chesapeake Bay and its watershed are an ecosystem and resource of enormous economic, social, and environmental significance. Yet the Bay is imperiled by decades of human activities that have burdened its streams, rivers, and estuary with excessive pollution, destroyed vital habitat for aquatic life and waterfowl, and dramatically reduced commercial and recreational fisheries.

To restore the Chesapeake Bay watershed to health, bold action is needed. In May 2009 the six watershed states, the District of Columbia, and the federal government agreed that by no later than 2025 they would have completed implementing the measures necessary to restore water quality in the Chesapeake Bay watershed. As part of the President's commitment to federal leadership in that effort, the U.S. Environmental Protection Agency (EPA) intends to adopt an accountability framework to ensure that the measures are identified, committed to, implemented, and reported to the public.

The key to restoring water quality in the Chesapeake Bay watershed is to achieve significant reductions in nitrogen, phosphorous, and sediment loads. In 2008 total estimated nitrogen and phosphorus loads from the watershed to the Bay were 284 million pounds and 16.3 million pounds, respectively. To meet water quality goals for the Bay, nitrogen and phosphorus loads will have to be reduced by 30 percent and 8 percent, respectively, despite expected population increases of 30 percent between 2000 and 2030.¹

Achieving such loading reductions will require significant reductions in the following: runoff from urban and suburban lands and farmland; discharges of nutrient pollution from municipal and industrial wastewater facilities; leaching to surface waters from onsite (septic) systems; and atmospheric deposition of nitrogen to the Bay and its watershed. EPA intends to work with the six watershed states, the District of Columbia, federal partners, local governments, and other parties to put in place a comprehensive, transparent, and accountable set of commitments and actions that, together, ensure that the technologies and management practices needed to restore Bay water quality are implemented by no later than 2025.

Section 202(a) of the President's Executive Order, Chesapeake Bay Protection and Restoration, directs EPA to prepare a report on the next generation of tools and actions for restoring the Bay under existing legislative authorities. This draft report identifies the pollution control strategies and actions that EPA recommends to protect and restore Bay water quality and reflects consultation with state agencies and input from other stakeholders.

EPA's 202(a) strategy has three principal components:

1. **Create a new accountability framework to guide federal and state efforts to restore the Bay.** In December 2010, EPA will establish a Total Maximum Daily Load (TMDL) for the Chesapeake Bay (called the *Bay TMDL* in this document).² As part of developing the Bay TMDL, EPA provided on November 4, 2009, the watershed states and the District of Columbia with draft load reduction targets for nitrogen and phosphorus for each major river basin. As first stated in a letter EPA released in September 2008 and described in more detail in a second letter released on November 4,

¹ As of late October 2009, estimates of the sediment reductions needed are being recalculated using newly available models.

² The section Current Policy and Legal Framework, below, provides more information on TMDLs and the Bay TMDL in particular.

2009, EPA expects that the Bay seven jurisdictions will use those draft loading targets to further subdivide the needed reductions among point and nonpoint sources of nutrient and sediment pollution. Using that information, EPA intends to establish in the Bay TMDL wasteload allocations (WLAs) and load allocations for those sources.

Because the Bay TMDL will allocate pollutant reductions to both point and nonpoint sources to meet the Bay's water quality standards, EPA expects the six watershed states and the District of Columbia to provide EPA with documented *reasonable assurance* that nonpoint source loading reductions will be achieved as a condition for reflecting such reductions in the Bay TMDL. Pursuant to the Clean Water Act (CWA) section 117(g) and other authorities, EPA has built on the forthcoming Bay TMDL and announced its *expectations* for commitments by the six watershed states and the District of Columbia to achieve the pollutant reductions needed to restore the Bay. In brief, EPA expects the six watershed states and the District of Columbia to do the following:

- Develop Watershed Implementation Plans that identify necessary load reductions across source sectors and geographic area, as well as actions and program enhancements to achieve the reductions and dates by which any necessary regulations or other instruments would be established and implemented
- Achieve the pollutant reductions needed from all sources as identified in the Watershed Implementation Plans through regulations, permits, or enforceable agreements³
- Adopt a series of two-year milestones detailing near-term actions and loading reduction targets to evaluate progress toward water quality goals

While more than two decades of voluntary, cost-share, and regulatory efforts to reduce nutrient and sediment pollution from point and nonpoint sources to the Chesapeake Bay watershed have made some important progress, that progress has not been sufficient to restore the Bay in a reasonable period of time. Limited public funds further constrain agencies' abilities to restore water quality at all levels of government. EPA believes that the watershed jurisdictions need to take strong action to assure the public that nutrient and sediment problems in the Bay will be reduced and controlled in the face of continued population growth and development of the watershed. EPA believes that states' adoption of enforceable or similarly accountable pollution-control programs will reduce pollutant loadings to a degree far greater than EPA and the Bay watershed jurisdictions have been able to accomplish to date.

Along with its expectations, EPA will identify a number of potential actions or *consequences* that EPA may take if jurisdictions do not commit to establish and fully implement Watershed Implementation Plans or their two-year milestone commitments for nutrient and sediment control. Those consequences may include, but are not limited to the following:

³ EPA encourages but would not expect states that did not sign the Chesapeake 2000 Agreement but have committed to the water quality goals through a Memorandum of Understanding (Delaware, New York and West Virginia) to commit to implementing nutrient and sediment load reductions based solely on regulations, permits or enforceable agreements if they commit to an alternative program or programs that EPA can be assured will result in necessary loading reductions and demonstrate progress toward these goals through two-year milestones.

- Revising the draft or final pollutant WLAs in the Bay TMDL to assign more stringent pollutant reduction responsibilities to point sources of nutrient and sediment pollution
- Objecting to state-issued CWA National Pollutant Discharge Elimination System (NPDES) permits
- Acting to limit or prohibit new or expanded discharges of nutrients and sediments
- Withholding, conditioning, or reallocating federal grant funds
- Taking other actions as appropriate

EPA would hold itself accountable by adopting two-year federal milestones for completing the actions described in item 2 below. EPA also would work with its federal partners, the six Bay watershed states, and the District of Columbia to control wastewater discharges and prevent runoff from federal facilities and lands, and account for those actions using federal two-year milestones or a similarly transparent process.

2. New rulemakings/actions under the CWA, the Clean Air Act (CAA), and other authorities. To lead by example, EPA would initiate several actions to establish transparent accountability and set strong performance standards for restoring the Bay.

EPA will initiate rulemakings under the CWA to reduce nitrogen, phosphorus and sediment pollution in the Chesapeake Bay watershed from the following sources. However, if the Chesapeake Bay states/DC strengthen their pollution control programs to achieve the reductions in nutrient and sediment pollution needed to meet Bay water quality standards, EPA does not expect that it would promulgate new Chesapeake Bay-specific regulations.

- **Concentrated animal feeding operations (CAFOs).** Expand coverage and set stronger minimum performance standards for permits, including for the land application of animal manure.
- **Stormwater.** Expand the coverage of the regulatory municipal separate storm sewer system (MS4) program to include high-growth areas and strengthen minimum performance standards within permits consistent with Bay water quality goals.
- **New or expanded discharges of nutrients, sediment.** Ensure that new or expanded discharges are offset by appropriate reductions when needed to meet Bay water quality goals. Such offsets would account for scientific uncertainty and would be in addition to existing reductions necessary to achieve Bay water quality goals
- **Other pollutant sources.** As necessary, EPA will initiate rulemaking under the CWA to address additional pollutant sources

EPA would propose and finalize its rulemakings as expeditiously as possible.

EPA would implement a Chesapeake Bay compliance and enforcement strategy that focuses on four key sectors—stormwater, CAFOs, municipal and industrial wastewater facilities, and stationary and mobile air sources.

EPA would ensure that advanced nutrient removal technologies are installed by the 483 municipal and industrial wastewater dischargers that, collectively, discharge about 90

percent of the total municipal/industrial wastewater flow to the Bay, as necessary to meet those facilities' water quality-based permit limits. EPA would take action to ensure that the technology upgrades stay on schedule, including objecting to draft permits as appropriate.

EPA would work closely with the Bay Clean Water State Revolving Fund (SRF) programs to encourage them to make or increase their investments in SRF-eligible Bay restoration projects and market the program to prospective recipients in the Bay watershed.

To help the states manage pollution from onsite (septic) systems, EPA would develop a model state program for states to consider using to reduce discharges from onsite systems. EPA expects that jurisdictions commit to achieve Bay TMDL onsite system load allocations through state-enforceable or similarly effective programs.

EPA would substantially reduce nitrogen deposition by implementing its current nitrogen emission control programs and establishing air deposition allocations as part of the load allocations for the Bay TMDL. EPA would analyze whether additional reductions are needed to meet the air allocation targets.

The Executive Order directs agencies to consult with the Federal Leadership Committee and, to the extent practicable and authorized under existing authorities, begin implementing core elements of their protection and restoration programs and strategies as soon as possible and before releasing a final strategy. While EPA develops new regulations and programs, the Agency will also take action using a range of existing authorities to reduce nutrient and sediment pollution to the Bay.

EPA would account for, and track progress on, all its rulemakings, actions, and their subsequent pollution reductions by adopting federal two-year milestones.

3. **An enhanced partnership between the U.S. Department of Agriculture (USDA) and EPA to implement a *Healthy Waters—Thriving Agriculture* initiative.** Meeting the challenges in the Bay would require federal agencies to commit and coordinate resources on a scale that matches the scope of the environmental and agricultural issues in the region. EPA has a unique opportunity to undertake with USDA several new and ambitious efforts that build and expand on the strong working relationships that have been reinforced in developing the Chesapeake Bay Watershed Initiative. Several key areas could result in significant improvements for the Bay and farming communities:

- Target resources in priority watersheds—Strategically expand intensive use of key conservation practices in the high-priority agricultural watersheds by aligning EPA, USDA, and other partner resources to engage farmers in nutrient and sediment reduction efforts.
- Establish centerpiece projects to address agricultural challenges—Align federal, state, and private resources and partnerships to establish high-profile projects to tackle some of the most challenging agricultural issues facing the Bay.
- Collaborate in developing next-generation conservation planning tools with other federal, state, agricultural, and research partners.

- Develop technologies—Align EPA programs and resources with USDA efforts to achieve water quality improvements by developing critically needed tools and technologies to help farmers meet their conservation and farm operation objectives.

By aligning resources and continued work with federal, state, and local partners, EPA and USDA's collaboration would accelerate the wider adoption of conservation practices and support innovative efforts to address some of the most pressing challenges to meeting water quality and agricultural goals in the Bay.

Introduction

Background

Importance of the Bay

The Chesapeake Bay is one of the most extraordinary places in America. This unique estuary is the largest in the nation and third largest in the world. Its 64,000-square-mile watershed spans parts of six states—Delaware, Maryland, New York, Pennsylvania, Virginia, and West Virginia—and the entire District of Columbia. The Bay and its watershed have remarkable ecological, economic, recreational, historic, and cultural value to the region.

Economists have estimated the Bay's value at more than \$1 trillion, and its bounty includes more than 500 million pounds of seafood per year.

Supporting more than 3,600 species of plants, fish, and other animals, the Chesapeake is home to 29 species of waterfowl and is a major resting ground along the Atlantic Flyway.

History and Progress of Earlier Recovery Efforts

Since 1983, a state-federal Chesapeake Bay Program has coordinated and conducted Chesapeake Bay watershed restoration efforts.

The Chesapeake Bay Program partners are the U.S. Environmental Protection Agency (EPA); the U.S. Department of Agriculture (USDA); Delaware, Maryland, New York, Pennsylvania, Virginia, and West Virginia; the District of Columbia; the Chesapeake Bay Commission, a tri-state legislative body; and advisory groups of citizens, scientists, and local government officials. The restoration effort has also involved numerous other federal agencies, including the National Oceanic and Atmospheric Administration (NOAA), National Park Service, U.S. Army Corps of Engineers (USACE), U.S. Department of Defense, U.S. Fish and Wildlife Service, U.S. Forest Service, and the U.S. Geological Survey (USGS).

The Chesapeake Bay Program's Executive Council leads the partnership, which is composed of the governors of the Chesapeake Bay states, the mayor of the District of Columbia, the chairperson of the Chesapeake Bay Commission, and the administrator of EPA.

The partnership has been guided by a series of agreements, including *Chesapeake 2000* that established goals for the Bay's health and commitments to adopt restoration measures to return the ecosystem to a healthy state. The Bay Program has developed unparalleled watershed science and cooperative efforts, and pioneered cleanup strategies that have resulted in measureable gains in reducing the flow of pollutants into the Bay and improving aquatic habitat for the Bay's living resources—all in the face of rapidly growing population in the watershed.

Yet despite so much important work, the Bay's health is still severely degraded and unacceptable. It continues to have poor water quality, degraded habitats, and low populations of many species of fish and shellfish. On the basis of those three areas, the overall health of the Bay in 2008 averaged 38 percent, with 100 percent representing a fully restored ecosystem. Water quality is only at 21 percent of goals, primarily because of pollution from excess nitrogen, phosphorus, and sediment entering the water. The main sources of the pollutants are agriculture, urban and suburban runoff, wastewater, and airborne contaminants.

Need for Further Action

The Bay Program's Executive Council has acknowledged that the 2010 restoration goals called for in the *Chesapeake 2000* agreement will not be met. Among other shortfalls, current efforts to reduce nutrient and sediment pollution are not sufficient to meet the Bay's water quality goals. In May 2009, the Executive Council set a new deadline to have all restoration measures in place no later than 2025, paced by a series of two-year milestones.

To restore the Chesapeake Bay and its watershed, many more measures must be put in place to reduce pollution, restore habitats, manage fisheries, protect watersheds, and foster stewardship. It will take a determined and concerted effort—a new dynamic—to advance from a Bay that is meeting only a fraction of its health goals to one that is fulfilling its promise as one of the world's most productive and valuable estuaries.

Executive Order Directive for this Report and its Integration into a Coordinated Strategy for Protecting and Restoring the Bay

On May 12, 2009, President Obama signed Executive Order 13508—*Chesapeake Bay Protection and Restoration*—to protect and restore the health, heritage, natural resources, and social and economic value of the nation's largest estuary system: the Chesapeake Bay.

In the preamble to this order, the president states a number of findings, including the following:

- Despite significant efforts by federal, state, and local governments, the Bay is not meeting existing water quality standards or the *fishable and swimmable* goals of the CWA.
- The current level and scope of pollution control programs for the Bay are not likely to restore the Bay for many years.
- The pollutants that are largely responsible for the Bay's pollution are nutrients (in the form of nitrogen and phosphorus) and sediment. Those pollutants come from many sources, including sewage treatment plants, city streets, development sites, agricultural operations, and deposition from the air onto the waters of the Chesapeake Bay and the lands of the watershed.
- Restoring the Bay will require a renewed commitment to controlling pollution from all sources, as well as protecting and restoring habitat and living resources, conserving lands, and improving management of natural resources, all of which contribute to improved water quality and ecosystem health.
- The federal government should lead the effort. Executive departments and agencies, working in collaboration, can use their expertise and resources to contribute significantly to improving the Bay's health. Progress in restoring the Chesapeake Bay also will depend on the support of state and local governments, the enterprise of the private sector, and the stewardship provided to the Chesapeake Bay by all the people who make this region their home.

Section 202 of the Executive Order directs federal departments and agencies to draft seven reports that address key challenges to protecting and restoring the Bay within 120 days (by September 9, 2009). Section 202(a) directs EPA to draft a report that makes recommendations for the next generation of tools and actions that will be used to restore the Bay, as well as changes to regulations, programs, and policies for implementing those actions.

In drafting this report, section 301 of the order directs EPA to consult with appropriate state agencies on how to maximize the Agency's use of authorities under the CWA to protect and restore the Bay. The order directs EPA to consider appropriate revisions to guidance and regulations and identify pollution control strategies and actions under EPA's existing authorities that do the following:

- a) Establish a clear path to meeting, as expeditiously as practicable, water quality and environmental restoration goals for the Chesapeake Bay
- b) Are based on sound science and reflect adaptive management principles
- c) Are performance oriented and publicly accountable
- d) Apply innovative and cost-effective pollution control measures
- e) Can be replicated in efforts to protect other bodies of water, where appropriate
- f) Build on the strengths and expertise of federal, state, and local governments, the private sector, and citizen organizations

Section 302 of the Executive Order requires that the strategies and actions identified by the EPA administrator in preparation of the section 202(a) report include the following elements (to the extent permitted by law):

- a) CWA tools, including strengthening existing permit programs and extending coverage where appropriate
- b) New, minimum standards of performance where appropriate, including the following:
 - i. A schedule for implementing key actions in cooperation with states, local governments, and others
 - ii. Watershed-based frameworks that assign pollution-reduction responsibilities to pollution sources and maximize the reliability and cost-effectiveness of pollution-reduction programs
 - iii. A compliance and enforcement strategy

Section 203 of the order directs a Federal Leadership Committee (FLC), chaired by EPA Administrator Jackson, to review the seven draft reports submitted under section 202 of the order, including EPA's section 202(a) report, and suggest appropriate revisions to the reports. The FLC will integrate these reports and prepare a draft strategy for coordinated implementation of existing programs and projects to guide efforts to protect and restore the Bay that, to the extent permitted by law:

- a) Defines environmental goals for the Chesapeake Bay and describe milestones for making progress toward attaining the goals
- b) Identifies key measureable indicators of environmental condition and changes that are critical to effective federal leadership
- c) Describes the specific programs and strategies to be implemented, including the programs and strategies described in draft reports developed under section 202 of this order

- d) Identifies the mechanisms that will assure that governmental and other activities, including data collection and distribution, are coordinated and effective, relying on existing mechanisms where appropriate
- e) Describes a process for implementing adaptive management principles, including a periodic evaluation of protection and restoration activities

Within 180 days (by November 9, 2009), the FLC will publish the draft strategy for public comment, and the agencies will release their final section 202 reports. Within one year, the FLC will publish a final strategy. To the extent practicable and permitted under existing authority, agencies may begin implementing core elements of their restoration and protection programs, in consultation with the FLC, as soon as possible and before the final strategy is released.

In preparing the reports under section 202 and the strategy under section 203, the order directs agencies and the FLC to consult extensively with Chesapeake Bay states and the District of Columbia. The goal of this collaboration is to ensure that federal actions to protect and restore the Bay are coordinated with the actions of state and local agencies, and most efficiently use the resources, authorities, and expertise of all levels of government (federal, state, and local) to benefit the Chesapeake Bay.

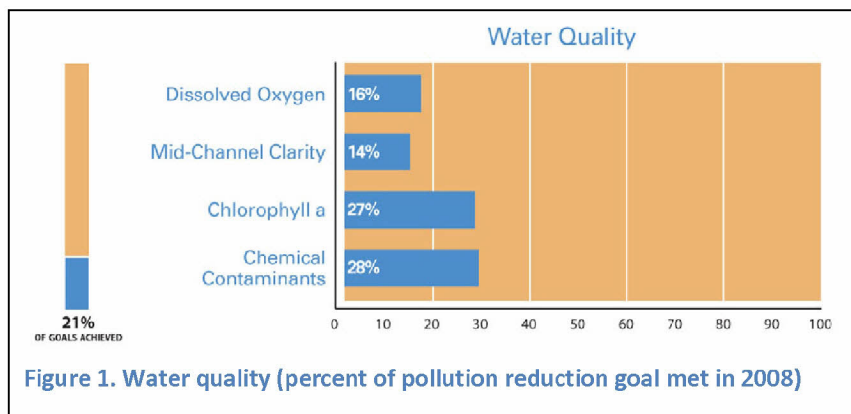
State Consultation and Outreach

While drafting this report, EPA staff met with officials from each of the six Chesapeake Bay watershed states and the District of Columbia and met with the Principals' Staff Committee of the Chesapeake Executive Council. EPA held a number of listening sessions with developers and homebuilders, the agricultural community, and local governments. EPA staff attended numerous public meetings to speak and answer questions.

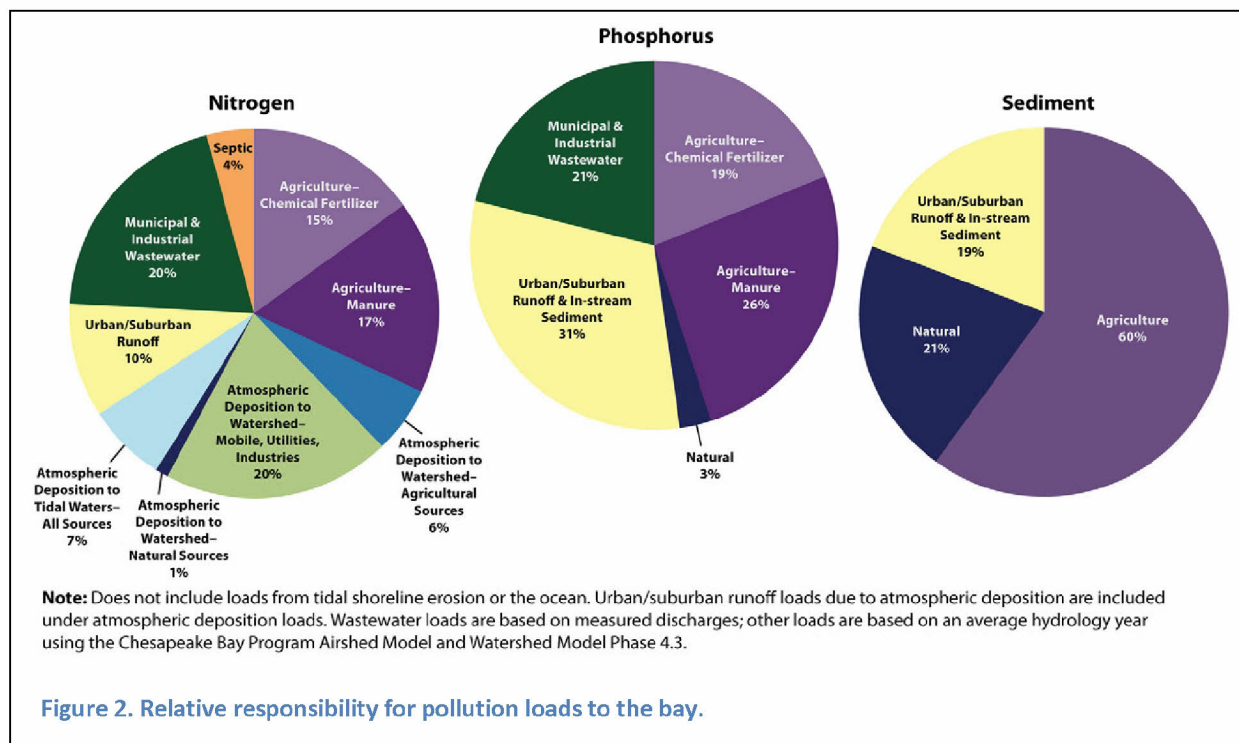
The Water Quality Challenge: Nutrients and Sediment

Water quality is a critical measure of the Chesapeake Bay's health. For the Bay to be healthy and productive, the water must be safe for people and support aquatic life, such as fish, crabs, and oysters. The water should be fairly clear, have enough oxygen, contain the proper amount of algae, and be free from chemical contamination.

Excess nitrogen, phosphorus, and sediment lead to murky water and algae blooms, which block sunlight from reaching Bay grasses and create low levels of oxygen for aquatic life. In 2008 water quality was again very poor, meeting only 21 percent of the goals established in the *Chesapeake 2000* agreement (see Figure 1).



The main sources of nutrient and sediment pollution are agriculture, urban and suburban runoff, wastewater, and atmospheric deposition (Figure 2).



Agriculture

Agriculture covers about 25 percent of the watershed, representing the largest intensively managed land use. An estimated 87,000 farms cover about 8.5 million acres. Agriculture is the number one source of nutrient and sediment pollution to the Bay. While significant efforts and progress have been made, improperly applied fertilizers and pesticides still flow into creeks, streams, and rivers, carrying excess nitrogen, phosphorus, and chemicals into the Bay. Tilling cropland and irrigating fields can cause major erosion. Additionally, the nutrients and bacteria in animal manure can seep into groundwater and run off into waterways.

Urban and Suburban Lands

Human development, ranging from small subdivisions to large cities, is a major source of pollution for the Bay. About 17 million people live in the Chesapeake Bay watershed. In fact, because of the region's continued population growth and related construction, runoff from urban and suburban lands is the one of the sources of pollution that is increasing. These areas are covered by impervious surfaces (such as roads, rooftops, and parking lots) that do not let water penetrate. As a result, water runs off into waterways instead of filtering into the ground. The runoff carries pollutants including lawn fertilizer, pet waste, chemicals, and trash.

Wastewater

There is a tremendous volume of sewage that must be treated in the watershed. The pollution-reduction technologies used in the past by the 483 major municipal and industrial wastewater

treatment plants did not remove enough pollution, particularly nitrogen and phosphorus. Upgrading the facilities is now underway, so they can remove more pollution from the water, but that effort will take time and is very expensive. As population in the Bay watershed increases, additional advanced wastewater treatment will be needed to keep wastewater loads from increasing.

Loads from septic systems, which release nitrogen that can eventually end up in the Bay or its tributary waters, are also increasing.

Air Pollution

When pollution is released into the air, it eventually falls onto land and water. Even larger than the Chesapeake Bay's watershed is the Bay's airshed (Figure 3), which is defined as the area containing the air emission sources contributing 75 percent of the nitrogen deposited from the air to the Bay and its watershed. With that definition, the Chesapeake Bay airshed is about 570,000 square miles, or seven times the size of the watershed. Nitrogen and chemical contaminants such as mercury and polychlorinated biphenyls (PCBs) from air pollution contribute to poor water quality in the region. Air pollution is generated by a variety of sources, including power plants, industrial facilities, farming operations, and automobiles and other gas-powered vehicles. About 21–28 percent of nitrogen loading to the Bay comes from non-agricultural atmospheric deposition, more than from all municipal and industrial wastewater treatment plants.



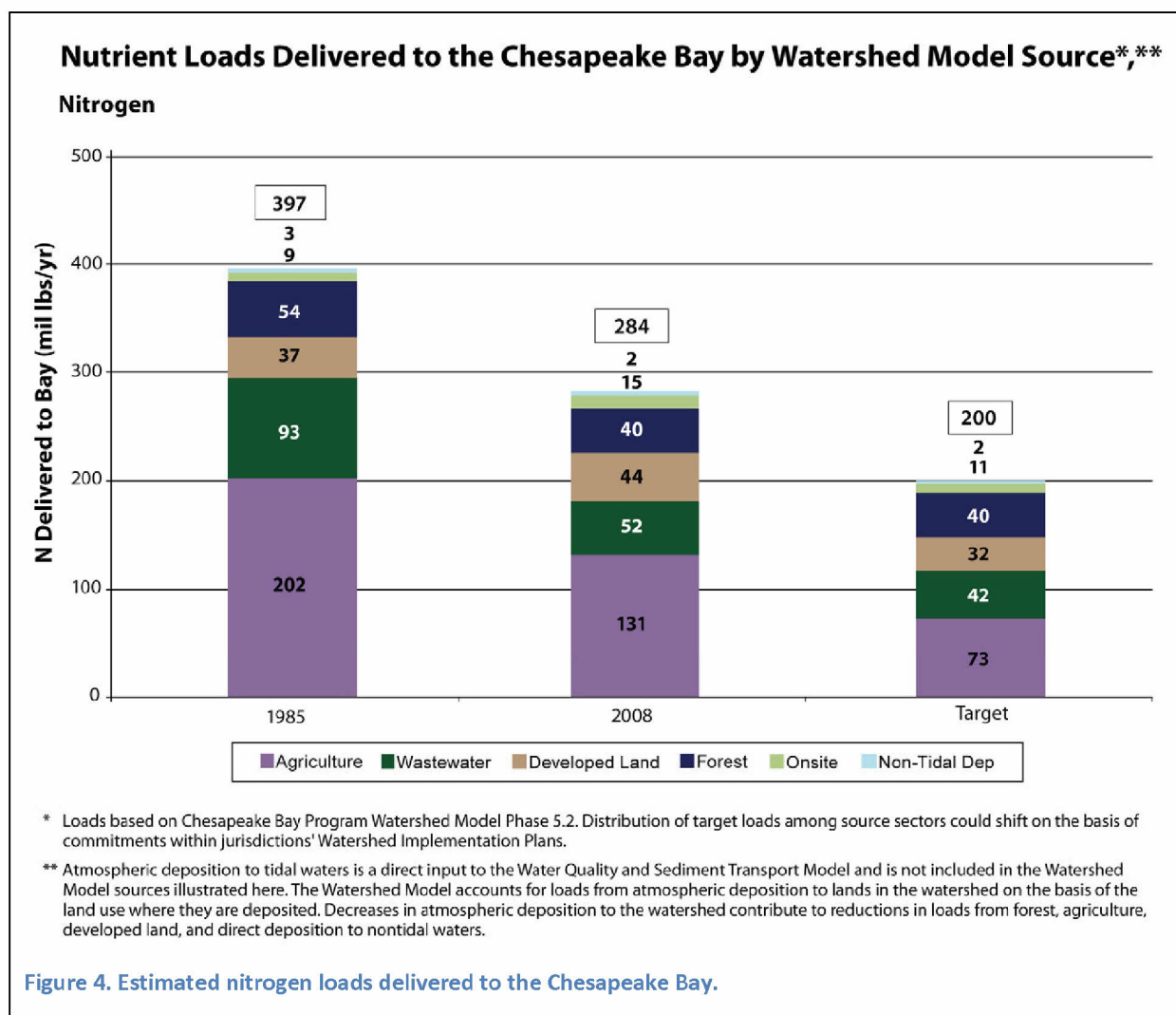
Figure 3. The Chesapeake Bay airshed.

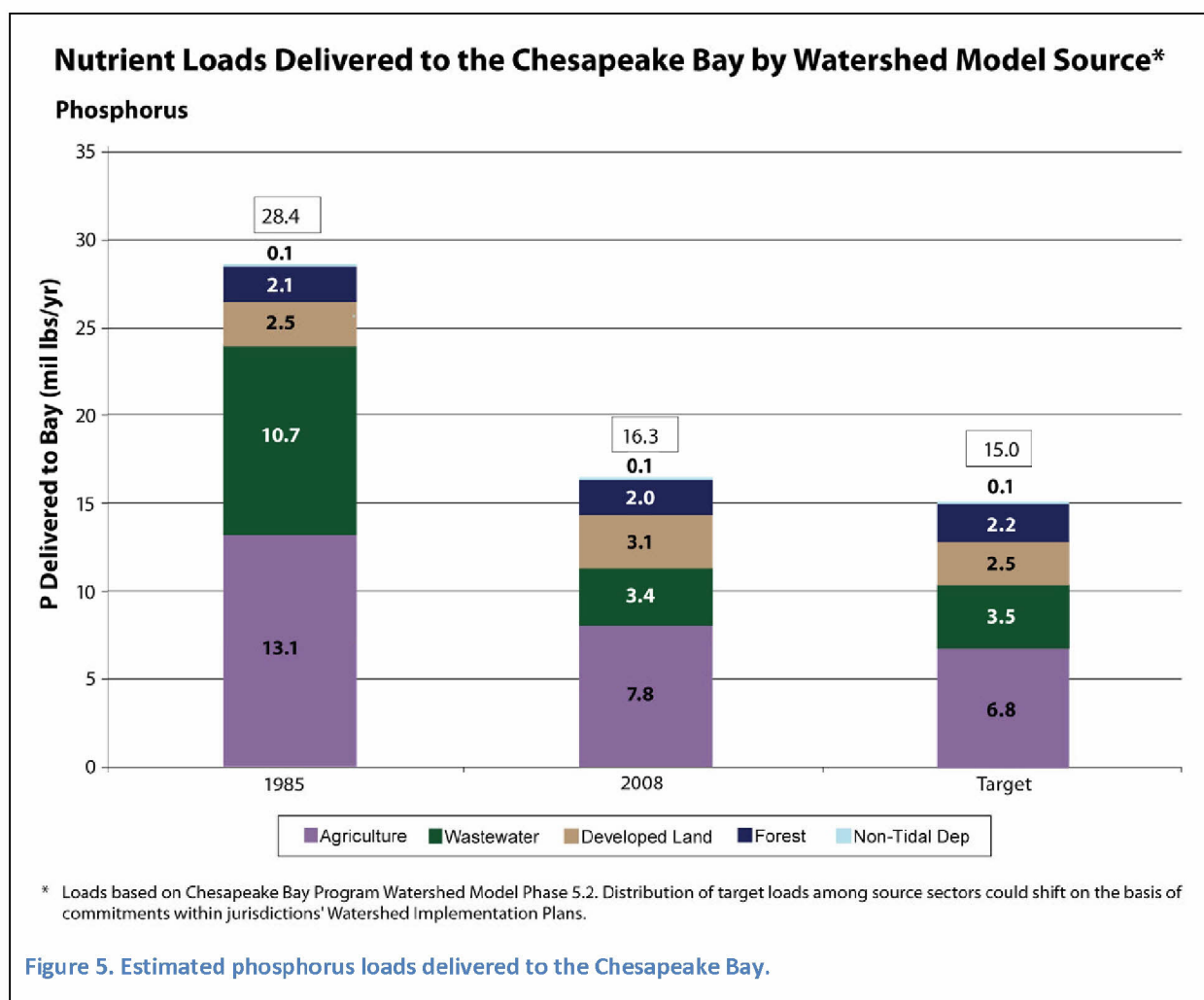
Reducing Pollution

In July 2009 EPA announced draft basinwide target loads that the Bay could receive and meet water quality standards: 175 million pounds of nitrogen and 14.1 million pounds of phosphorus, annually. On the basis of subsequent analysis by EPA, the Chesapeake Bay Program Principals' Staff Committee approved revising the draft target to 200 million pounds of nitrogen and 15 million pounds of phosphorus, annually. (The Chesapeake Bay receives an additional 17 million pounds of nitrogen loads through direct atmospheric deposition to the Bay's tidal waters.) Despite all the progress made to date, achieving target loads of 200 million pounds of nitrogen and 15 million pounds of phosphorus will require a further 30 percent reduction in nitrogen loads and a further 8 percent reduction in phosphorus loads from estimated 2008 levels (Figures 4 and 5). The Chesapeake Bay Program Office has not yet run updated scenarios for sediment. Those estimates are subject to change as EPA develops the Chesapeake Bay TMDL.

The Chesapeake Executive Council has committed to implement all controls necessary to restore the Bay's water quality by no later than 2025. Restoring water quality in the Chesapeake Bay watershed will require significantly more widespread implementation of pollution reduction practices by all categories of sources of nutrient and sediment pollution to the Bay.

Reducing pollution will become an even greater challenge as population and development in the Bay watershed increase. The population is expected to increase by almost 30 percent between 2000 and 2030, thereby increasing wastewater and septic system loads. If current trends continue, impervious cover could increase 60 percent by 2030, leading to greater stormwater runoff. Pollution from agricultural might not decrease as fewer acres are in cultivation because the density of animals could increase. This all means that programs to achieve the states' Bay water quality standards must account for growth as well as address existing loads.





Current Legal and Policy Framework

This section contains legal and policy background information that is useful for understanding key elements of EPA's section 202(a) report and, in particular, how EPA intends to use its existing CWA authorities to set new expectations for states to control discharges of nutrient and sediment sources to the Bay.

Ongoing Efforts to Develop a Bay TMDL for Nutrients and Sediment

Because the water quality goals set forth in the *Chesapeake 2000* agreement will not be met by 2010, and because impaired segments of the Bay remain on the states' CWA section 303(d) lists, EPA is establishing a federal Total Maximum Daily Load (TMDL) for nutrients and sediment for the Chesapeake Bay and its tidal tributaries. As described in CWA section 303(d), a TMDL identifies the pollutant loading reductions needed for a waterbody to meet applicable water quality standards. The Bay TMDL, which will be the largest watershed TMDL to date, will account for all nutrient and sediment loadings to the Bay and its tidal tributaries from within the 64,000-square-mile Bay watershed. That watershed includes parts of six states (New York, Pennsylvania, West Virginia, Maryland, Delaware, and Virginia) and the District of Columbia. The Bay TMDL is scheduled to be completed in December 2010.

EPA Region 3, the lead agency for the Bay TMDL, is working with EPA Region 2 and modeling and water quality experts at the Chesapeake Bay Program Office to develop the Bay TMDL. EPA has directly engaged the six watershed states and the District of Columbia in the process through the Chesapeake Bay Program's committee structure.

Under the TMDL process, EPA provided the six watershed states and the District of Columbia on November 4, 2009, with draft loading reduction targets for nitrogen and phosphorus for each major river basin on the basis of recommendations from the Chesapeake Bay Program Principals' Staff Committee. EPA expects that the seven jurisdictions will use these draft loading targets to further subdivide the needed reductions among point and nonpoint sources of nutrient and sediment pollution. Using that information, EPA intends to establish wasteload allocations (WLAs) and load allocations for those sources in the Bay TMDL.

Because the Bay TMDL will allocate pollutant reductions to both point and nonpoint sources to meet the Bay's water quality standards, EPA expects the six watershed states and the District of Columbia to provide EPA with documented *reasonable assurance* that nonpoint source loading reductions will be achieved as a condition for reflecting such reductions in the Bay TMDL. The six states and the District of Columbia will demonstrate this reasonable assurance by developing *Watershed Implementation Plans*. On November 4, 2009, EPA released its expectations that the plans include the following:

1. Identification of nutrient and sediment loads that would achieve water quality standards in the Bay and tidal tributaries, and distribution of the loads among point and nonpoint sources.
2. Identification of the current loads delivered to the Bay and state and local capacity to achieve the needed reductions (i.e., an assessment of current point source permitting/treatment upgrade funding programs, nonpoint source control funding, programmatic capacity, regulations, legislative authorities, participation, and compliance rates).
3. Estimates of future loads from population growth and development in the watershed, and procedures for offsetting the growth.
4. Identification of the gaps between current program capacity and capacity needed to achieve nutrient and sediment controls (additional incentives, new or enhanced state or local regulatory programs, market-based tools, technical or financial assistance, new legislative authorities, and such).
5. A commitment from each state and the District of Columbia to work to systematically build the program capacity needed to achieve the nutrient and sediment reductions. As part of that commitment, the jurisdictions would agree to meet specific, iterative, and two-year milestones demonstrating increased levels of implementation and/or nutrient and sediment load reductions.
6. A commitment to continue efforts underway to expand monitoring, tracking, and reporting directed toward assessing the effectiveness of implementation actions and use the data to drive accountability and adaptive decision making, and redirect management actions.
7. An agreement that if jurisdictions do not meet these commitments, additional measures will be necessary.

Ultimately, because EPA- or state-issued permits under the CWA must include effluent limitations necessary to achieve the states' and District of Columbia's Bay water quality

standards, if nonpoint sources do not accomplish the loading reductions identified as necessary in the Bay TMDL, more stringent effluent limits in CWA permits for point sources might be necessary.

Chesapeake Executive Council 2025 Goal and two-year Milestones

A second component of the policy and legal framework is the May 2009 commitment of the Chesapeake Bay watershed's six state governors and the District of Columbia's mayor to ensure that all needed pollution-reduction controls and best management practices needed to restore Bay water quality are in place no later than 2025. The governors and the mayor also agreed to a process under which the jurisdictions committed to make program modifications and achieve interim targets for reducing pollutant loadings to the Bay in a series of *two-year milestones*.

CWA Section 117(g)

A third component of the policy and legal framework is CWA section 117, which includes provisions specific to the Chesapeake Bay and its watershed. In particular, Congress added section 117(g) in 2000 which, among other provisions, states, "The Administrator, in coordination with other members of the Chesapeake Executive Council, shall ensure that management plans are developed and implementation is begun by signatories [EPA, Maryland, Virginia, Pennsylvania, District of Columbia, and the Chesapeake Bay Commission] to the Chesapeake Bay Agreement to achieve and maintain—

- (A) the nutrient goals of the Chesapeake Bay Agreement for the quantity of nitrogen and phosphorus entering the Chesapeake Bay and its watershed;
- (B) the water quality requirements necessary to restore living resources in the Chesapeake Bay ecosystem;" section 117 (g)(1).

Section 117(g) provides a legal framework for ensuring that the signatory jurisdictions develop and begin implementing management plans that achieve the nutrient and sediment loading reductions needed to restore the Bay.

The other three states in the Chesapeake Bay watershed—New York, Delaware, and West Virginia—have formally committed to act as full partners in carrying out Chesapeake Bay Program initiatives designed to restore water quality by signing a Memorandum of Understanding with the signatories in 2000 (Delaware, New York) and 2002 (West Virginia). Those states have since signed several Chesapeake Executive Council directives making additional Bay water quality restoration commitments, including adoption of jurisdiction-specific, two-year water quality milestones described above.

Part I: Creation of a New Accountability Framework to Guide State, Local, and Federal Efforts to Restore the Bay

State Accountability

EPA would create a new accountability framework to guide state and local efforts to restore the Chesapeake Bay, building on the policy and legal framework described above, specifically

1. The section 117(g) directive to ensure that signatories of the *2000 Chesapeake* agreement and the Chesapeake Bay Water Quality Memorandum of Understanding develop and begin to implement programs that, among other goals, meet the nutrient reduction and water quality goals of the agreement.
2. The process, schedule, and legal requirements related to developing the Bay TMDL for nutrient and sediment pollution.
3. The May 2009 commitment by the six watershed states and the District of Columbia to have all needed pollution reduction controls and management practices necessary to restore Bay water quality in place no later than 2025 and to set and achieve interim, two-year water quality milestones toward meeting the 2025 goal.

In November 2009, EPA issued a letter to Preston Bryant, secretary of the Virginia Department of Natural Resources and chair of the Chesapeake Executive Council Principals' Staff Committee, calling for the development of Watershed Implementation Plans and future two-year milestones that meet EPA's strong, new expectations for reducing nutrient and sediment pollution from nonpoint sources for all six watershed states and the District of Columbia. While more than two decades of voluntary efforts to reduce nutrient and sediment pollution from nonpoint sources to the Chesapeake Bay have made some important progress, that progress has not been sufficient, in part, because of limited public funds and authorities and is not likely to ensure the Bay's restoration in a reasonable period. Therefore, EPA emphasized the need for strong commitments by all six watershed states and the District of Columbia because achieving water quality standards in the Bay requires significant reductions in loads from all source sectors throughout the Bay's watershed and airshed. EPA set forth its expectations that the seven watershed jurisdictions commit to achieve the pollutant reductions needed from all sources to achieve the states' and the District of Columbia's water quality standards for the Bay through the following:

- Developing Watershed Implementation Plans that (1) identify necessary load reductions across source sectors and geographic area, as well as actions and program enhancements to achieve these reductions, and (2) include commitments to dates by which any necessary regulations or other instruments identified in the Watershed Implementation Plans would be established and implemented. EPA would consider the program commitments when establishing wasteload and load allocations in the Bay TMDL.
- Committing to achieve the pollutant reductions needed from all sources as identified in the Watershed Implementation Plans through regulations, permits, or enforceable agreements⁴

⁴ Enforceable agreements can include voluntary, incentive-based programs with contracts specifying the practices that will be implemented using cost-share dollars.

- Committing to establish a series of two-year milestones detailing near-term actions and loading reduction targets to evaluate progress toward water quality goals

States that did not sign the *Chesapeake 2000* agreement but have committed to the water quality goals through a Memorandum of Understanding (Delaware, New York, and West Virginia) would not have to commit to regulations, permits, or enforceable agreements if they commit to an alternative program or programs that EPA can be assured will result in necessary loading reductions and demonstrate progress toward these goals through two-year milestones.

EPA believes this new expectation for enforceable or similarly effective programs will help reduce loadings to a degree far greater than EPA and the Bay watershed jurisdictions have been able to accomplish to date.

EPA transmitted preliminary nutrient loading targets for the major river basins in each state and the District of Columbia in a letter to the Principals' Staff Committee on November 4, 2009. EPA will transmit preliminary loading targets for sediment to the jurisdictions in spring 2010. EPA expects all seven watershed jurisdictions to submit Watershed Implementation Plans documenting from which point and nonpoint sources, and where within each river basin, reductions will occur to meet those load targets. EPA expects that Watershed Implementation Plans will include sufficient detail to inform limits and conditions within new or reissued National Pollutant Discharge Elimination System (NPDES) permits.

EPA's Bay TMDL allocations would reflect EPA's decisions regarding the sufficiency of the demonstrations of reasonable assurance and other commitments in the jurisdictions' Watershed Implementation Plans. If EPA does not have adequate reasonable assurance that nonpoint source reductions will occur, the Agency could establish smaller WLAs requiring more stringent permit limits on point sources or take other actions to ensure that loading reductions will be achieved. EPA would use the two-year water quality milestone process to track the six watershed states' and the District of Columbia's follow-through on their Watershed Implementation Plan commitments to address program gaps and make reasonable progress toward achieving the pollution loading reductions identified in the Bay TMDL.

The Watershed Implementation Plans would be the first step in an ongoing accountability framework to assess progress toward implementing necessary controls on the ground no later than 2025 to meet the jurisdictions' water quality standards in the Bay. EPA would continually evaluate commitments and progress through updates to the Watershed Implementation Plans and future two-year milestones that incorporate more detailed commitments than the first two-year water quality milestones adopted by the seven watershed jurisdictions in May 2009.

Finally, EPA would identify a menu of potential actions, or consequences, from which EPA would select, if states do not submit adequate Watershed Implementation Plans or two-year milestone commitments or fail to meet their established two-year water quality milestones. The actions might include, but are not limited to the following:

Revising draft or final Bay TMDL to impose more stringent requirements on point sources of nutrient and sediment pollution. If the watershed jurisdictions' Watershed Implementation Plans do not adequately demonstrate reasonable assurance that nonpoint source loads will, in fact, be achieved, EPA, in the final Bay TMDL or through future revisions to the Bay TMDL, could decrease the WLAs for point sources to the limit of technology. Similarly, if the jurisdictions do not complete implementation steps related to nonpoint source allocations in the Bay TMDL, or if the jurisdictions do not make reasonable progress toward achieving nonpoint source load reductions as defined through the two-year

milestones, EPA could revise the Bay TMDL in the future to decrease the WLAs for point sources.

EPA objection to state-issued NPDES permits. EPA could use its existing authority to object to inadequate state permits and assure that appropriate permit limits are established consistent with the Bay TMDL's WLAs.

Addressing new or expanded discharges of nutrients and sediments. EPA could use its existing regulations to deny or aggressively limit new or increased discharges from point sources to the Bay watershed. For example, EPA could review and object to permits if the permit fact sheets do not demonstrate that effluent limits are consistent with assumptions and requirements of WLAs in TMDLs pursuant to Title 40 of the *Code of Federal Regulations* (CFR) 122.44(d)(1)(vii)(B) or if the jurisdiction has not demonstrated how the increased discharged loads will be offset through other source reductions that are in addition to reductions already expected to meet Bay TMDL allocations.

EPA could review facilities covered under a general permit and, if found to be noncompliant, request that state NPDES directors require the facility to apply for an individual permit pursuant to 40 CFR 122.28(b)(3).

EPA could ensure, through a permit objection, that the requirement in 40 CFR 131.12(a)(2) (as reflected in state antidegradation regulations) is met (i.e., that "all cost-effective and reasonable best management practices for nonpoint sources are achieved" when a Tier 2 antidegradation review is done for the issuance of a CWA point source permit).

Withholding/reallocating federal grant funds under CWA sections 117 and 319. EPA could condition grants or negotiate state work plans in a manner designed to improve existing state program implementation regarding the Chesapeake Bay. EPA now conditions CWA section 117(e)(1)(a) implementation grants to signatory jurisdictions in this manner.

EPA could do the following: withhold all or a portion of state grant funds unless the state commits to take steps to improve its existing program; redistribute federal funds to other states that will use the grant monies more effectively; target grants to specific geographic areas or practices; or decide which facilities or projects are funded in a state receiving federal funds.

EPA envisions that the new accountability framework would work as follows:

- **States and the District of Columbia develop a Watershed Implementation Plan by November 1, 2010, unless otherwise noted, that does the following:**
 - **Sets nutrient and sediment reduction targets** by watershed for each CWA 303(d) tidal water segment, and by pollutant source sector needed to achieve the TMDL loading caps. By November 1, 2011, Bay watershed jurisdictions would update the plans to (1) distribute loads among local areas such as counties, conservation districts, or subwatersheds, and (2) identify specific controls that would be in place by 2017 and would be capable of achieving nutrient and sediment load reductions totaling 60 percent of the difference between 2008 nutrient and sediment loads and target loads that meet Bay watershed jurisdictions' Bay water quality standards.
 - **Evaluates current pollutant loads and existing legal, programmatic, financial, and technical capacity** to reduce nutrients and sediment.
 - **Accounts for growth**, including estimates of future loads from population growth and development in the watershed, and procedures for offsetting the growth.

- **Identifies gaps** between the needed pollutant load reductions and existing program capacity to deliver reductions.
- **Commits to a strategy** for filling those gaps, including a schedule for reducing loads on the basis of descriptions of planned program delivery enhancements.
- **Identifies tracking and reporting protocols** to assess the effectiveness of implementation actions and drive accountability and redirect management actions.
- **Identifies contingencies** for slow or incomplete implementation of nutrient and sediment controls.
- **States set two-year milestones** for achieving specific pollution-reduction actions and program enhancements to maintain the established schedule.
- **States/EPA monitor effectiveness** of the implemented pollution-reduction actions to assess load reduction progress and water quality response.
- **EPA employs consequences** if there are insufficient commitments in a jurisdiction's Watershed Implementation Plan or a jurisdiction does not fully meet its two-year milestones.

Figure 6 depicts how the new accountability framework would work.

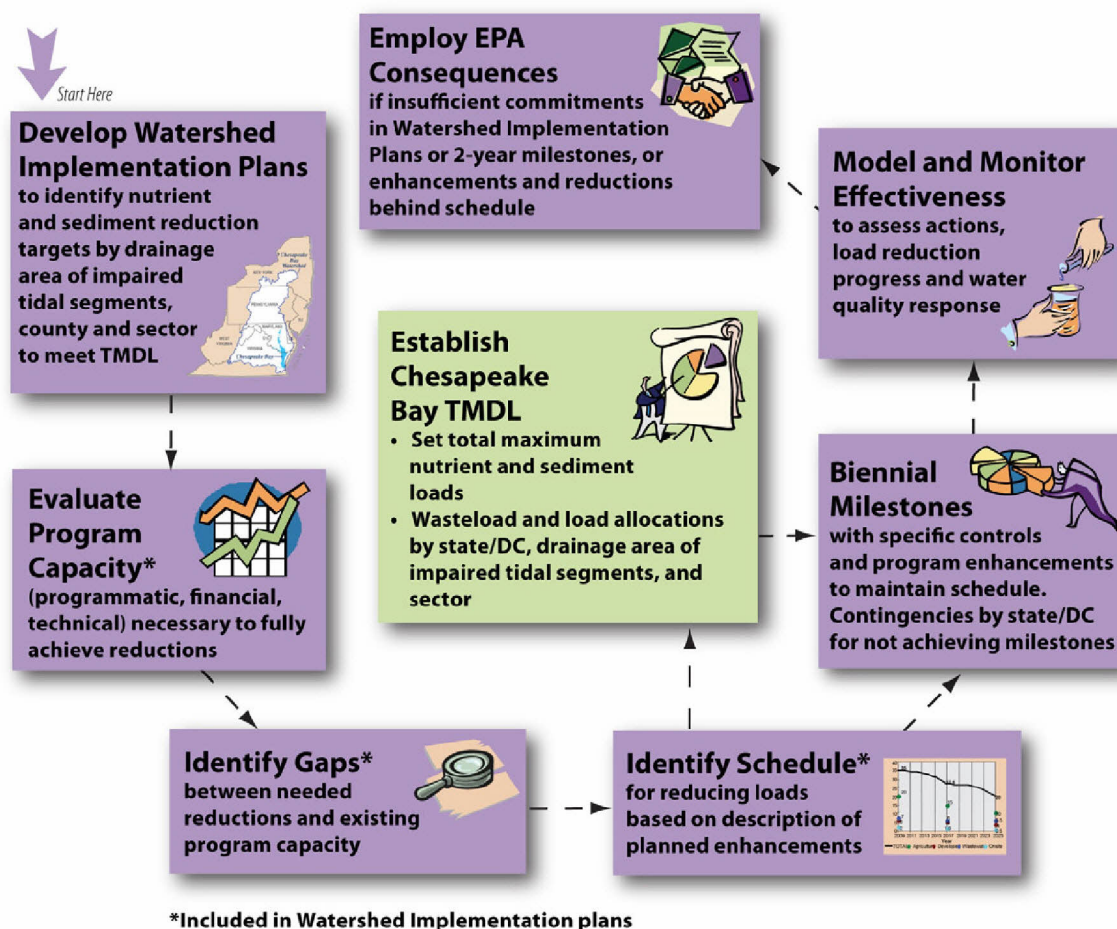


Figure 6. The state accountability framework.

EPA (Federal) Accountability

To guide federal efforts, EPA would coordinate an effort among federal departments and agencies to directly complement state/DC actions. That effort would establish specific federal two-year milestones for further reducing air pollution, further controlling and preventing runoff from federal facilities and lands, and strengthening other federal policies for the Chesapeake Bay and its watershed and airshed.

EPA and its federal partners would join the seven Bay watershed jurisdictions in committing to two-year milestones for rulemakings and other key actions for reducing nutrient and sediment pollution to the Bay. EPA, along with other federal agencies, would adopt and report on the two-year milestones concurrently with state/DC adoption and progress reporting on their jurisdictional two-year milestones.

For examples of the new rulemakings and actions that EPA would initiate and include in a process for adopting and reporting on two-year milestones, see Part II of EPA's draft 202(a) plan below.

Part II: New Rulemakings and Actions

EPA would immediately take a number of important new actions to help reduce nutrient and sediment loads to the Bay, including new proposed rulemakings and implementing a compliance and enforcement strategy focused on four key sectors—stormwater, concentrated animal feeding operations (CAFOs), municipal and industrial wastewater facilities, and stationary and mobile air sources. In moving forward with the regulations and other actions, EPA would work closely with its regulatory partners, NPDES-authorized states, as well as local governments and watershed stakeholders such as point sources, nonpoint sources, and the affected communities.

The approaches described below outline EPA's current thinking regarding how the Agency would proceed with rulemakings. EPA rulemakings would include notice and comment before final action. With the rulemakings, EPA would significantly strengthen or clarify federal requirements that would further limit nutrient and sediment discharges to the Bay. If, however, the Bay watershed jurisdictions strengthen their pollution-control programs to achieve the reductions in nutrient and sediment pollution needed to meet Bay water quality standards, EPA does not expect that it would promulgate new Chesapeake Bay-specific regulations.

Stormwater

Background and Current Control Strategies

Urban and suburban stormwater discharges contain nutrients and sediment from pet wastes, lawn fertilizers, construction activity, developed property, and contaminants deposited from air to urban/suburban lands. These nutrients and sediment affect local water quality and habitats as well the Bay downstream. According to the Chesapeake Bay Watershed Model, Airshed Model, and measured discharges, approximately 10 percent of the total nitrogen (TN), 31 percent of the total phosphorus (TP), and 19 percent of the total sediment load to the Bay is from discharges of stormwater from urban and suburban areas. (Note, those figures do not include atmospheric nitrogen that deposits on urban lands and is then delivered to the Bay.)



During rain events, stormwater carries sediment and other pollutants into waterbodies and eventually the bay (Source: USDA NRCS).

Reductions in nutrient and sediment loads delivered by stormwater are necessary to meet the basinwide loading caps. Those reductions could be achieved through federal or state rulemaking and/or actions through the NPDES program.

Urban and urbanizing areas contribute significant nutrient and sediment loads to the Bay as a result of high amounts of impervious cover. Impervious surfaces like roads, rooftops, and parking lots channel stormwater discharges directly to streams, rivers, and the Bay, greatly diminishing infiltration into the ground. As the population continues to increase in the Bay watershed, so does impervious cover from new homes, commercial buildings, and roads. Between 1990 and 2000, human population in the Bay watershed increased by 8 percent, while impervious cover increased by approximately 40 percent.

In addition to these impervious areas, turfgrass areas (lawns, recreational fields, golf courses) contribute significant amount of nutrients to local streams and the Bay because of fertilizer applications. Turfgrass areas often function like impervious surfaces because of highly compacted soils and, as a result, fertilizer is washed off by precipitation. Many of the highest nutrient and sediment discharges are in or near federally regulated municipal separate storm sewer systems (MS4s). MS4s include any publicly owned or operated stormwater conveyance system including those associated with roads and highways.

According to population projections by the USGS, the Bay watershed's human population is expected to continue to grow in coming decades, which, under current paradigms, means increased impervious surfaces. To prevent any additional nutrient and sediment loading to the Bay from stormwater, no net increase in stormwater discharges can result from newly developed sites.

To decrease stormwater-delivered nutrients and sediment loads, we must address both stormwater discharges that result from future addition of impervious cover and discharges from existing impervious areas. Those areas will require significant retrofit to encourage infiltration, reuse, and evapotranspiration of stormwater, thus reducing the amount of stormwater that carries nutrient and sediment loads to the Bay and reducing sediment contributions from in-stream scouring.

CWA section 402(p), enacted in 1987, establishes the framework for EPA to address stormwater discharges through implementation of a comprehensive program. EPA began implementing section 402(p) in 1990 through the Phase I stormwater regulations (see CWA section 402(p)(4); 55 Fed. Reg. 47990, November 16, 1990). In Phase I EPA established NPDES permit requirements for stormwater discharges associated with industrial activity, including construction activity disturbing 5 acres or greater, and discharges from MS4s serving populations of 100,000 or more. The second phase of regulations under CWA section 402(p) authorized EPA to examine the remaining unregulated stormwater discharges and identify, pursuant to CWA section 402(p)(6), those discharges requiring regulation to protect water quality (see CWA section 402(p)(6); 64 Fed. Reg. 68722, December 8, 1999). The Phase II regulations require NPDES permits for stormwater discharges associated with construction activity disturbing 1 to 5 acres and discharges from MS4s serving populations of fewer than 100,000 in urbanized areas, including entities serving highways and large complexes such as hospitals, prisons, and universities.

Additionally, EPA regulations provide for the exercise of its authority under CWA section 402(p)(2)(E) and (6) to designate additional stormwater discharges in 40 CFR 122.26(a)(9)(i)(C)-(D) (also known as *residual designation authority* or *RDA*). EPA continues to have authority to designate additional stormwater discharge sources to be regulated pursuant to CWA section 402(p)(6).

Under the current federal stormwater regulatory program are three broad categories of regulated discharges: (1) stormwater discharges from certain MS4s; (2) stormwater discharges associated with construction activity; and (3) stormwater discharges associated with industrial activity (see 40 CFR 122.26; 122.30-37). EPA can designate additional stormwater discharges, such as those from impervious surfaces above a certain size threshold, using RDA or CWA section 402(p)(6) designation authority. Stormwater dischargers that require NPDES permits can either obtain individual permits or, with the exception of medium and large MS4s, obtain coverage under state or EPA general permits (see 40 CFR 122.28).

EPA issues permits for the District of Columbia and federal facilities in Delaware. Otherwise, all the Bay watershed states administer their NPDES programs, and have generally followed the minimum federal requirements (Table 1). Maryland has included some general retrofit requirements in some of its Phase I MS4 permits, and considers its non-prescriptive approach to have met with only limited success; its experience however, offers lessons for designing future efforts. West Virginia finalized a small MS4 permit in June 2009 with a performance standard for new and redevelopment approaching no net increase in stormwater discharges; that permit is under appeal (Figure 7).

What EPA Could Do in the Chesapeake Bay Watershed

EPA would initiate rulemaking that would reduce the volume and pollutants loads in stormwater discharges to the Bay. The rulemaking process would include all necessary analyses, including economic, to determine appropriate standards and thresholds. In this process, EPA would examine the following elements related to stormwater discharges:

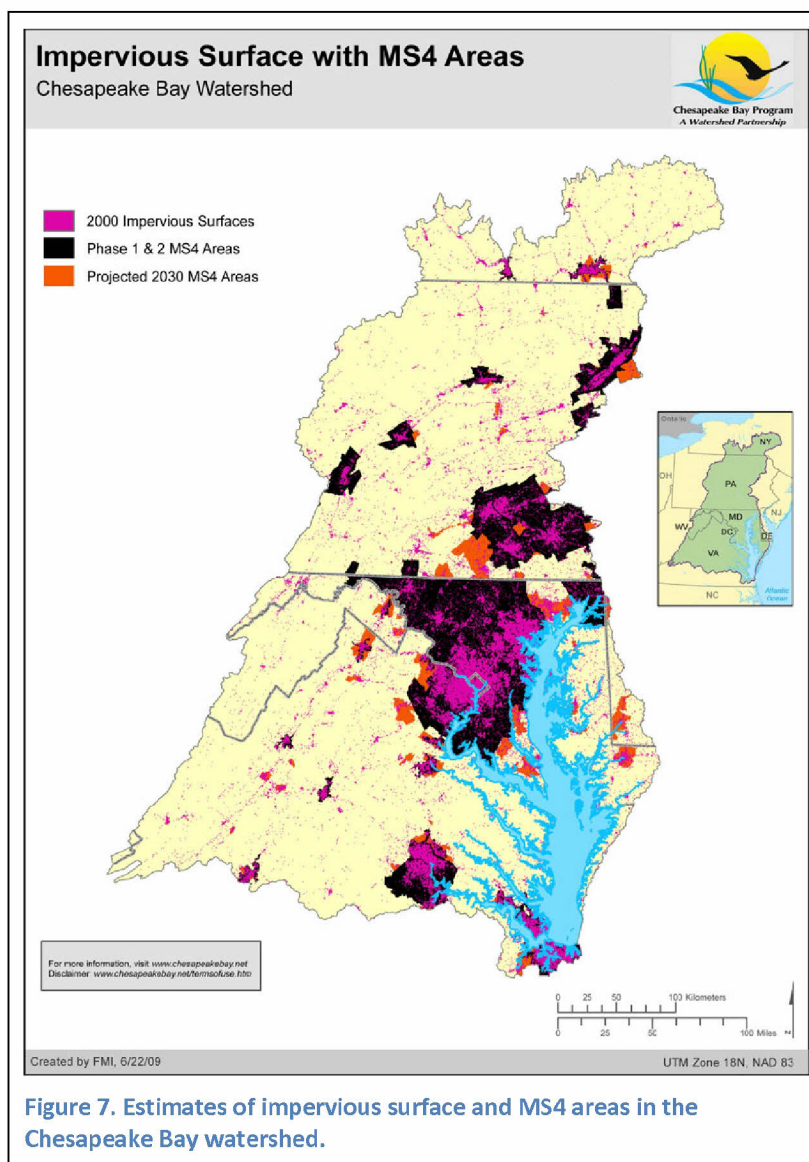


Figure 7. Estimates of impervious surface and MS4 areas in the Chesapeake Bay watershed.

Table 1. Stormwater permittees by state and in the Chesapeake Bay watershed, summer 2009

Stormwater permit type	DC		DE		MD		NY		PA		VA		WV		Total	
	Bay-wide	DC-wide	Bay-wide	State-wide	Bay-wide	State-wide	Bay-wide	State-wide	Bay-wide	State-wide	Bay-wide	State-wide	Bay-wide	State-wide	Bay*	States
MS4 Phase I	1	1		14	11	11	0	1	0	2	11	11	0	0	23	40
MS4 Phase II	0	0		3	82	82	34	502	206	727	75	90	3	45	400	1,449
Industrial	60	60		337	1,578	1,578	122	1,393	1,238	2,494	975	1,432	113	933	4,086	8,227
Construction	212	212		1,375	8,300	8,332	470	7,251	906	2,399	2,252	2,851	651	2,488	12,791	24,908
Total	273	273		1,729	9,971	10,003	626	9,147	2,350	5,622	3,313	4,384	767	3,466	17,300	34,624
% Permittees in the Bay	100%				99%		7%		42%		76%		22%		53%*	

Note: Numbers of permittees are not static and, especially for categories like construction, are fluctuating regularly.

* Not including Delaware

Additional requirements to address stormwater from newly developed and redeveloped sites. EPA would consider setting requirements that ensure no increases in discharge volumes and control the discharge of pollutants. This could be done by requiring that post-construction hydrology mimic pre-construction hydrology. Developers could estimate this on a site-by-site basis or rely on a default retention performance standard equivalent to the 95th percentile storm volume for all new development projects larger than a certain size. In the Chesapeake Bay watershed, such a standard would mean retaining on-site stormwater from a rainfall event of about 1.2 to 1.7 inches. The standard could vary to include incentives for types of development that reduce overall imperviousness at a watershed scale (e.g., high-density, transit-oriented, redeveloped sites).

A requirement for newly developed sites would prevent stormwater discharges from increasing. Cost analyses of retention approaches to stormwater management indicate that for newly developed sites, retention approaches are competitive with conventional approaches to stormwater management.

Similar to retrofits (next section) a requirement for redeveloped sites provides the opportunity for reduced loadings. Incremental costs have not been estimated but could be offset in many cases by incentives and/or alternatives such as off-site mitigation (as long as any mitigation used to offset another load were in addition to reductions already necessary to meet the states' Chesapeake Bay water quality standards), as relevant.

Requiring retrofits in areas served by MS4s to reduce loads from existing stormwater discharges. Approximately 17 percent of the Bay watershed is covered by MS4 permits. Within those MS4 areas, significant expanses of impervious surfaces generate stormwater discharges. Therefore, EPA will consider establishing a retrofit provision requiring MS4s to develop and implement retrofit plans for discharges from existing developed sites.

Such retrofit requirements would reduce stormwater discharges and, therefore, the overall load contribution of nutrients and sediments to receiving waters. Appropriate schedules for the retrofits could be developed on a case-by-case basis, considering the MS4's financial capability.

Implementing an aggressive retrofit program within existing MS4 areas could result in nitrogen, phosphorus, and sediment load reductions (see Table 2) within 15–25 years. A number of caveats and assumptions are attached to these estimates, including that they are based only on loads to and from current MS4 areas rather than all urban and urbanizing areas in the watershed. Similar types of reductions could be realized across wider areas of the watershed if retrofit requirements are applied outside existing MS4 areas. EPA estimates costs for such retrofits in existing MS4s at about \$7.9 billion per year.

Table 2. Estimated load reductions from retrofit programs in existing MS4 areas

	Total nitrogen	Total phosphorus	Sediment
Existing load	7,027,362 lbs	900,868 lbs	287,295 tons
Load after implementation	4,466,768 lbs	571,231 lbs	181,732 tons
Reduction delivered load	2,560,594 lbs	329,637 lbs	105,563 tons
Cost effectiveness*	\$3,088/lb delivered	\$23,984/lb delivered	\$37/lb delivered

* Includes capitol costs as well as operation and maintenance. These ratios are calculated as if each pollutant was the only one being reduced when, in fact, they might be removed concurrently.

Expanding the universe of areas regulated under the MS4 program. EPA's rulemaking would examine revising the geographic areas subject to MS4 permits. EPA would consider using existing residual designation authority and rulemaking options for reducing pollutants from stormwater discharges from areas that are vulnerable to future development pressures.

EPA would also consider using existing authority to ensure that MS4 permits have specific, quantifiable limits and milestones that are consistent with water quality needs, including TMDL WLAs, and provide a clear basis for compliance assistance and/or enforcement actions as appropriate.

The federal partners will continue to lead by example by committing that federal facilities in the Chesapeake Bay watershed meet new performance standards for enhanced stormwater management. The Bay TMDL's WLAs and load allocations would specifically reflect those heightened expectations for federal facilities and lands. MS4 permits issued to federal facilities defined as MS4s and permits issued to MS4s to which federal facilities discharge would contain permit conditions consistent with the Bay TMDL's WLAs. EPA would track progress toward meeting enhanced stormwater management by federal facilities through its federal two-year milestones.

Concentrated Animal Feeding Operations (CAFOs)

Background on Animal Feeding Operations

Farms are a vital part of the Chesapeake Bay watershed and, as described in Part III of this report below, EPA and USDA would work together on a *Healthy Waters—Thriving Agriculture* initiative to help farmers produce abundant and affordable foods while managing nutrients and soils in a manner that helps to restore the Bay's water quality and the values and benefits that derive from clean water and a healthy, vibrant Bay ecosystem.

As described above (see the Water Quality Challenge: Nutrients and Sediment in the Introduction), significant reductions in nutrient and sediment pollution are needed to meet water quality goals for the Bay. All categories of sources of these pollutants will need to take significant new action to help meet the challenge.



CAFOs are a source of nitrogen, phosphorus, and sediment to the Chesapeake Bay (Source: Chesapeake Bay Program).

Farms have made strong progress in reducing loadings to the Bay (as shown in Table 3), although it should be noted that some of the reductions resulted from converting agricultural land to other uses, such as urban and suburban development, which also deliver nutrient and sediment pollution to the Bay.

Table 3. Estimated changes in agricultural loadings to the bay

	1985 Ag load	2008 Ag load
Nitrogen (million lbs/yr)	202	131
Phosphorus (million lbs/yr)	13	8

Based on Chesapeake Bay Program Watershed Model Phase 5.2.

Yet even with that progress, agriculture is still the largest contributor of nitrogen, phosphorus, and sediment pollution to the Bay. Manure is the source of about half of the nutrient loading from agriculture.

One of the issues needing attention is excess manure nutrients in some parts of the Chesapeake Bay watershed. Extensive poultry operations and associated feed grain production on the Delmarva Peninsula, for example, have resulted in elevated nutrient levels in soils, groundwater, creeks, and tidal tributaries of the Chesapeake Bay.⁵ Nutrient budgets conducted by the USDA Cooperative State Research, Education, and Extension Service Mid-Atlantic Water Program reveal excess nutrients not only on the Delmarva Peninsula, but in other regions with concentrated animal production such as south-central Pennsylvania (in which the dominant industry is dairy and to a lesser extent swine and poultry) and the Shenandoah Valley in Virginia (broilers and turkeys are the dominant sectors and to a lesser extent small and medium-sized dairies). Without new action, the nutrient excess in parts of the Bay watershed is likely to grow according to (1) projections of growth in the animal agriculture sector that add to the manure nutrients generated, and (2) decreases in acres of farmland to accept the nutrients as farmlands are converted to other uses (e.g., urban/suburban lands).

Given the many challenges, EPA believes that a new rulemaking to address pollution from animal feeding operations (AFOs) is an important component of a larger program for restoring the Bay.

The animal agriculture sector includes AFOs, CAFOs, and pasture-based operations. AFOs keep and raise animals in confined settings, which concentrate animals, feed, manure and urine, and production operations on a small land area. Feed is brought to the animals rather than the animals grazing or otherwise seeking feed in pastures, fields, or on rangeland.

CAFOs are defined as large-scale AFOs where animals are confined and raised in concentrated areas and are regulated under the NPDES. An AFO is defined in the NPDES regulations as a Large CAFO if it confines above the threshold number of animals in a sector, such as 700 mature dairy cows, 1,000 beef cattle, or 125,000 chickens.⁶ A medium-sized operation can be a CAFO either by definition (number of animals plus either a discharge through a conveyance or a stream running through facility) or by designation. A small operation can be a CAFO only if it is designated by the EPA Regional administrator or state permitting authority upon meeting specified criteria, including that it is a significant contributor of pollutants to waters of the United States. EPA is unaware of any designated small CAFOs in Chesapeake Bay watershed states; however, Region 3 could designate a small AFO as a CAFO in the near future.

The CWA establishes that CAFOs are point sources and requires CAFOs that *discharge or propose to discharge* to seek permit coverage. See 40 CFR 122.23(d). EPA has authorized all six Chesapeake Bay watershed states to administer the NPDES program for CAFOs, and each state is in the process of revising its jurisdiction's CAFO program to meet all federal requirements, including recently established federal rule revisions. Authorized states also may have NPDES programs that are more stringent or with greater scope of coverage than the federal

⁵ Status of Nutrients in Delmarva Soils, Groundwaters, Creeks, and Tributaries, Chesapeake Research Consortium, (October 21, 2003).

⁶ A layer or broiler operation is a large CAFO with 30,000 or more chickens if the facility has a system defined as a liquid manure handling system.

requirements.⁷ For example, New York requires all CAFOs to obtain either an NPDES permit or a state permit, depending on whether the CAFO discharges.

What EPA Could Do in the Chesapeake Bay Watershed

EPA would initiate a rulemaking that would reduce nutrient and sediment discharges from CAFOs to the Chesapeake Bay. During a CAFO rule-development process, EPA would engage with states and stakeholders to ensure that the process is informed by successful programs already implemented in Chesapeake Bay states. As part of the rulemaking, EPA would examine a number of key elements including the following:

Increasing the size of the universe of CAFOs with NPDES permits

Designating more AFOs as CAFOs. EPA would consider revising the provisions for designating AFOs as CAFOs, 40 CFR 122.23(c), to allow designation in more circumstances and provide broader authority for EPA and authorized states to designate AFOs. Such a change would better facilitate imposing permit requirements on operations that are contributing to water quality impairments.

Revising existing CAFO regulations so that more animal operations qualify as CAFOs. EPA would consider bringing a greater number of animal operations into the CAFO universe in the Chesapeake Bay watershed on the basis of a record that certain types of facilities should now be considered to be CAFOs by definition. For example, EPA would consider lowering the threshold number of animals required for an AFO to meet the definition of CAFO (40 CFR 122.23(b)). EPA also would consider defining as a CAFO any AFO that (1) discharges or proposes to discharge into an impaired water; (2) discharges into waters of the United States through a man-made device; or (3) discharges directly into waters of the United States that pass through the facility.

Issuing stronger CAFO permits that contain terms and conditions that further reduce the discharge of nutrients from CAFOs to the Bay.

Requiring permitted CAFOs to implement *next generation* Nutrient Management Plans (NMPs). EPA would consider revising minimum NMP elements in the CAFO rule to further prescribe agricultural practices essential for load reductions on the basis of sound science and adaptive management principles, such as using a soil test phosphorus method, restrictions on fall and winter application of manure, sediment management, using cover crops, and enhanced sampling requirements. Under a new rule that increases the size of the CAFO universe as described above, a much larger portion of row crop acreage in the Bay watershed would be associated with CAFOs, and thus subject to implementing *next generation* practices.

Off-site transfer reporting and record-keeping. Because many CAFOs do not own or lease enough land to apply the manure nutrients generated at the operation, off-site transfer of the manure is a common practice. EPA would consider revising the current CAFO rule to better regulate handling of all manure generated by CAFOs in the Chesapeake Bay watershed and increase accountability.

⁷ Note that Maryland and Pennsylvania have state laws that require special justification for the state NPDES program to be more stringent than the federal requirements.

EPA believes that a CAFO rulemaking containing these elements could achieve significant reductions in nitrogen, phosphorus, and sediment loadings. However, if EPA determines that each of the states in the Chesapeake Bay watershed has programs in place, or puts new programs in place, that achieve the same objectives, the federal rulemaking would not be necessary to accomplish these important load reductions. If EPA does develop a CAFO rule, such a rulemaking could impose costs on operations that, for the first time, would be required to apply for and comply with NPDES permit requirements for CAFOs. There would also be increased costs for all CAFOs to implement additional nutrient management requirements. The average total annual cost for extending the current CAFO regulatory requirements to all AFOs in the Chesapeake Bay watershed that meet the medium-sized-CAFO threshold is estimated at approximately \$50 million. That estimate does not include the additional next generation NMP components that EPA is considering requiring for all existing CAFOs and those AFOs to be included under a new rulemaking. Total reductions in nitrogen, phosphorus, and total suspended solids (a proxy for sediment) for implementing current CAFO requirements at medium AFOs are expected to be approximately 10 million, 7.4 million, and 90 million pounds per year, respectively. Additional nutrient and sediment reductions would be achieved by all permitted CAFOs implementing the next-generation NMP components.

In addition to a rulemaking for CAFOs, EPA would consider other new actions for CAFOs. For example EPA would consider working with states to achieve greater nutrient and sediment reductions from current CAFO rule requirements through new guidance and implementation efforts. One option would be to develop new guidance to address production area controls for runoff, including example water quality-based effluent limitations that can be established in a CAFO permit to meet water quality standards with respect to production area discharges. Another option would be for EPA to conduct, as part of ongoing efforts to implement the CAFO rule in the Bay states, a rigorous review of each state's technical standards for CAFOs and work with states to update the standards, as needed, to address water quality. To better facilitate permit objections discussed above in Part I of this report, EPA would consider classifying CAFO permits as *major* NPDES permits so that all CAFO individual permits are routinely made available to the Agency.

To support either new regulatory initiatives or actions under existing regulatory authority, EPA would consider using CWA section 308 to collect additional information about CAFOs. EPA lacks comprehensive information on the number, location, and nature of the entire universe of medium and large CAFOs. Such information could help EPA, as appropriate, develop new regulations and help EPA and the states, under current authorities, direct appropriate compliance assistance efforts, better identify technical assistance needs, establish targeted enforcement strategies in areas of concern, and develop voluntary programs and stakeholder partnerships.

New or Expanded Discharges of Nutrient and/or Sediment Pollution

EPA would quickly issue guidance on the appropriate use of offsets in the context of the Chesapeake Bay TMDL, scheduled for publication in December 2010.

EPA also would initiate a rulemaking that would clarify, at a minimum, how permitting authorities can authorize new or increased discharges related to population growth and development in the context of managing overall pollutant loads into impaired waters. Such a rule would, at a minimum, address how high-priority point source load increases could be managed so that the resultant load would be protective of water quality standards and achieve the goals of the president's Chesapeake Bay Executive Order.

EPA envisions that such a rulemaking would be consistent with EPA's national trading policy that addresses offsets. For example, EPA expects that any nonpoint source reductions that could be used to offset an additional point source load could be used to meet only water quality-based effluent limitations; the portion of any point source load that is covered under the technology-based requirements in the NPDES permit would continue to require appropriate treatment by that point source. EPA also expects that any source reductions used to offset a point source load would be only those reductions that occur beyond those reductions already required for the point or nonpoint source, such as those based on the allocation in TMDL, a permit or local regulation, as applicable.

Implementing that rule in coordination with the point source WLAs and nonpoint source load allocations in the Bay TMDL will be important as EPA and its partner states pursue Bay-wide management and lasting reductions of pollutants into the Bay. EPA intends to work cooperatively with USDA, our federal partners and the states to coordinate efforts regarding offsets, trading, and ecosystem services programs.

EPA Actions under CWA Section 319 and CZARA Section 6217

EPA would use CWA section 319(h)(8) to encourage the Bay watershed states to revise their CWA 319 management plans for the portion of the state in the Bay watershed to support the Bay TMDL and ensure consistency with the state's Watershed Implementation Plan. The management plans require, among other elements, identifying best management practices (also required in annual CWA section 319 grant applications) by source category that will be undertaken to reduce pollutant loadings; identifying BMP implementation programs; and a schedule containing annual milestones on a watershed basis for BMP implementation *at the earliest practicable date*. Significantly, section 319(h)(8) requires an EPA determination of *satisfactory progress* that the state is meeting its nonpoint source pollution reduction schedule as a condition of making CWA section 319 grants to the state.

In addition, section 6217 of the Coastal Zone Act Reauthorization Amendments (CZARA) requires states to develop coastal nonpoint pollution control programs and implement management measures in coastal zone areas (a significant subset of Bay drainage) with enforceable policies and mechanisms to assure their implementation. Section 6217(b)(3) also provides authority for *continuing revision* of states' management measures that are necessary to *maintain applicable water quality standards*. EPA would, as a condition of the CWA section 319 grant program, ask the six watershed states to review and revise or supplement their CZARA section 6217 management measures to make them adequate to meet the states' Chesapeake Bay water quality standards as part of an update to their state CWA section 319 nonpoint source management plan.

Publicly Owned Treatment Works (POTWs)/ Industrial Wastewater Discharge Facilities

Background on POTW/Industrial Wastewater Discharge Facilities

Wastewater discharge facilities contributed 20 percent of the TN and 21 percent of the TP loads delivered to Chesapeake Bay tidal waters in 2008.

The number of significant and nonsignificant wastewater treatment facilities by jurisdiction is listed in Table 4. Work is still underway to provide a full accounting of all nonsignificant industrial facilities.



Wastewater treatment facilities are sources of nitrogen and phosphorus to the Bay.

Table 4. Wastewater treatment facilities reported by the bay jurisdictions

State	Significant facilities*			Nonsignificant	Total (not including nonsignificant industrials)
	Municipal	Industrial	Total significant		
DC	1	0	1	1	2
DE	3	1	4	1	5
MD	75	10	85	182	267
NY	26	2	28	27	55
PA	183	30	213	1,204	1,417
VA	101	23	124	1,249	1,373
WV	13	15	28	134	162
Total	402	81	483	2,798	3,281

* States define a significant wastewater discharger as a facility that meets one of the following criteria:

- West Virginia, Delaware, and New York: facility treating domestic wastewater and the design flow is greater than or equal to 0.4 million gallons per day (mgd)
- Pennsylvania: facility treating domestic wastewater and discharging greater than or equal to 0.4 mgd
- Maryland: facility treating domestic wastewater and the design flow is greater than or equal to 0.5 mgd
- Virginia: facility treating domestic wastewater and the existing design flow is greater than or equal to 0.5 mgd west of the fall line or 0.1 mgd east of the fall line, as well as all new facilities greater than 40,000 gallons per day (gpd) or facilities expanding to greater than 40,000 gpd
- Across all seven jurisdictions: industrial facilities with a nutrient load equivalent to 3,800 TP lbs/year or 27,000 TN lbs/year
- Any other municipal and industrial facilities identified within a jurisdictional tributary strategy
- Wastewater facilities not meeting any of the criteria above are considered nonsignificant municipal or industrial facilities

Of the total nutrient loads from municipal and industrial wastewater dischargers, the 402 significant municipal facilities contributed 52 million pounds of nitrogen (89 percent of wastewater loads) and 3.8 million pounds of phosphorus (84 percent of wastewater loads) in 2008. The 81 significant industrial facilities contributed 5.7 million pounds of nitrogen (9 percent of wastewater loads) and 0.6 million pounds of phosphorus (13 percent of wastewater loads) in 2008.

In contrast, the 2,798 nonsignificant municipal facilities contributed 0.6 million pounds of nitrogen (2 percent of wastewater loads) and 0.1 million pounds of phosphorus (3 percent of wastewater loads) in 2008. Nonsignificant industrial facilities contributed less than 1 percent of the wastewater loads of both nutrient loads. NPDES permits are required under the CWA for all wastewater discharge facilities. The six watershed states issue these permits with EPA oversight. EPA Region 3 issues permits for the District of Columbia and for federal facilities in Delaware.

When the watershed jurisdictions adopted their respective tributary strategies to reduce pollution loads to the Chesapeake Bay, they also adopted annual TN and TP loading caps for individual significant municipal and industrial dischargers.

Table 5 lists the tributary strategy targeted discharge concentrations for TN and TP for significant and nonsignificant municipal facilities by jurisdictions.

Table 5. Tributary strategy target discharge concentration for municipal wastewater treatment facilities by jurisdiction

State	Significant facilities		Nonsignificant facilities		Flow
	TN (mg/L)	TP (mg/L)	TN (mg/L)	TP (mg/L)	
DC ^a	4.2	0.18	--	--	Design
DE ^b	TBD	TBD	--	--	Design
MD	4	0.3	18	3	Design
NY	5	0.5	8	1.5	Design
PA ^c	6	0.8	TBD	TBD	Design
VA ^d	3–6	0.3–1	8	1.5	Design
WV	5	0.5	8	1.5	Design

Notes:

mg/L = milligrams per liter

a. Blue Plains facility only.

b. Target discharge concentrations pending final tributary strategy, which is pending final Pollution Control Strategies for local TMDLs.

c. Target discharge concentrations will be established following a phased permitting approach.

d. Different target discharge concentration assigned on the basis of river basin.

The targeted discharge concentrations for industrial facilities are facility-specific across the seven watershed jurisdictions.

Collectively, the seven jurisdictions' tributary strategies cap basinwide wastewater loads at 43.8 million pounds of TN and 3.5 million pounds of TP.

As of May 2009, states and EPA have issued NPDES permits that include water quality-based effluent limits for TN and TP, on the basis of the facility-specific allocations in the jurisdictions' respective tributary strategies, to 252 of the 483 significant municipal and industrial facilities. The 252 facilities compose approximately 71 percent of significant facilities' design flow and 72 percent of significant facilities' total nutrient loads.

Under current schedules, permits for all significant municipal facilities will contain effluent limits according to their individual annual loading caps specified in the respective jurisdictions' tributary strategies by 2010 and all treatment upgrades required to meet the 2003 basinwide loading caps will be operational by 2014. Over 90 percent of nutrient reductions needed to reach the wastewater treatment facilities' basinwide loading caps are expected to be achieved by 2010,

through treatment technology upgrades and nutrient offset programs. By 2008, the industrial sector, as a whole, had met its tributary strategy loading allocations, although some individual facilities might not yet have their facility-specific loading allocations included in their NPDES permit.

While there might be some additional low-cost opportunities to reduce nutrient discharges from this sector (perhaps in the case of some industrial phosphorus discharges, for example), generally speaking, it would be very expensive to further reduce loadings from municipal and industrial wastewater dischargers below the established facility-specific cap loads in the tributary strategies. However, unless EPA and/or the Bay watershed jurisdictions or both expand and strengthen their programs to regulate other source sectors, such further reductions from municipal and industrial dischargers might be necessary to meet the states' water quality standards in the Bay.

Achieving the tributary strategy discharge levels or higher levels of treatment requires installation of costly, advanced treatment technologies. Upgrading to more stringent enhanced nutrient removal (ENR) levels for all significant municipal facilities in the Chesapeake Bay watershed, from a year 2008 baseline, could cost about \$919 million per year or about \$17 per pound of TN removed and about \$82 per pound of TP removed. Such unit costs are on a life cycle basis and include both capital and operational costs. Similar costs for upgrading all significant industrial facilities to more stringent ENR levels might cost about \$42 million per year, or \$10 per pound of TN removed and about \$23 per pound of TP removed. The total capital cost associated with those loading reductions could be as high as \$6.8 billion for significant municipal facilities and \$246 million for significant industrial facilities. Implementing phosphorus detergent bans and industrial manufacturing process changes could also reduce nutrient discharges.

What EPA Could Do in the Chesapeake Bay Watershed

EPA would ensure that advanced nutrient removal technologies are installed by the 483 municipal and industrial wastewater dischargers that collectively discharge about 90 percent of the total municipal/industrial nutrient loads to the Bay, where necessary to meet the facilities' water quality-based permit limits. EPA would continue its review of permits for significant municipal and industrial dischargers in the Chesapeake Bay watershed to ensure that their permits are consistent with the states' Bay water quality standards, the tributary strategy cap loads, and (when issued) the Bay TMDL's WLAs. As part of its review, EPA would ask states to document whether permits issued for such dischargers are consistent with the currently applicable Bay Tributary Strategy or TMDL WLAs and whether any such permits for which there is no allocation for growth would provide for offsets in accordance with EPA Region 3's December 2004 permitting strategy. See *NPDES Permitting Approach for Discharges of Nutrients in the Chesapeake Bay Watershed*, EPA Region 3, December 2004, http://www.epa.gov/reg3wapd/npdes/pdf/ches_bay_nutrients.pdf.

As described previously, if a jurisdiction's upfront Watershed Implementation Plan does not adequately demonstrate reasonable assurance, or if its two-year milestone commitments do not indicate that nutrient and sediment controls would be implemented on a schedule that meets the Executive Council's goal to have all controls needed to meet clean water goals in place by 2025, or if a jurisdiction does not fully implement its two-year milestones, EPA could impose more stringent requirements on its municipal and/or industrial dischargers.

EPA would work with states to ensure that WLAs in the Bay TMDL are based on federal wastewater facilities meeting appropriate effluent limits needed to attain water quality

standards. Such effluent limits could be as low as 3 mg/L and 0.1 mg/L for TN and TP, respectively, if necessary.

EPA Actions under the Clean Water State Revolving Fund (CWSRF) Program

EPA will work with the Chesapeake Bay state CWSRF programs to encourage them to make or increase their investments in Chesapeake Bay restoration projects and help them market their programs to prospective recipients in the Bay watershed. While states decide which projects to finance in any given year, EPA will coordinate with the Bay states' CWSRF programs and promote the use of CWSRF for funding priority Bay projects. In 2010 EPA will host a meeting with the CWSRF managers of the Bay states to elicit cooperation and partnership in using resources to better protect the Chesapeake Bay and to further leverage available resources.

Onsite (Septic) Systems

Background on Onsite Systems and Current Control Strategies

Onsite systems, also referred to as septic systems or decentralized systems, typically serve individual residences while clusters of onsite systems are used in small communities and can serve hundreds of homes. Small community cluster systems can provide more efficient treatment opportunities and are gaining in popularity as an alternative to individual onsite systems and centralized sewers because of more reliable centralized management approaches. EPA estimates that 2.3 million onsite systems were in the Bay watershed in 2008 (for distribution by state, see Table 6). EPA estimates that the number of onsite systems in the watershed will increase by 35 percent by 2030 to a total of 3.1 million systems.



Example of an advanced onsite treatment technology (Source: EPA Region 4).

Overall, onsite systems contributed about 4 percent of nitrogen loading to the Bay in 2008. Because of the strong retaining effects by underlying soils, most of the phosphorus in septic tank effluent is retained, resulting in very minimal phosphorus load to the Bay. While the typical onsite system can perform effectively when managed properly, it is not designed to reduce nitrogen and, thus, contributes significant nitrogen loads to groundwater, local streams, and, eventually, the Bay.

Table 6. Onsite systems in the Chesapeake Bay watershed

State	Total number of systems
NY	148,160
PA	759,221
MD	613,209
VA	682,098
WV	81,476
DE	24,996
DC	0
Bay-wide total	2,309,159

Most homes in the watershed with onsite systems have a conventional system that does little to reduce nitrogen loads to the environment. Recognizing an estimated 10–20 percent of homes experience malfunctions each year, and the significant amount of growth expected, the overall nitrogen loading to the Bay from onsite systems is expected to increase.

Advanced treatment technology is available to upgrade onsite systems to significantly reduce the nitrogen load in septic system effluent. For example, common denitrification systems can reduce about 50 percent of the

nitrogen load, while several newer technologies can achieve as much as 88 percent reduction. Denitrification system costs are in the range of \$8,000 to \$15,000 per house or more, with significant cost efficiencies associated with large clustered systems. Costs for nitrogen removal using these technologies would generally be more than \$100 per pound, perhaps \$114 to \$143 per pound.

Nitrogen reduction can also be achieved by modifying or replacing the soil dispersal system following the pretreatment components. Using a shallow dispersal system, such as drip irrigation, provides additional nitrogen removal through plant uptake and reduced loading rates. In addition, raised soil dispersal technologies, such as mounds, allows for greater attenuation of nitrogen. These options could provide a less costly alternative to replacing an entire onsite system.

Onsite systems are regulated at the state and local level by the health department in some states and the environmental department in others. Onsite systems are not subject to federal permit requirements, with a few exceptions. Onsite systems that serve multiple residences are regulated under the Safe Drinking Water Act for the purpose of protecting underground sources of drinking water. The CWA applies to discharges from onsite systems to waters of the United States.

Among Bay watershed states, Maryland has an aggressive program. Maryland's Bay Restoration Fund (\$30 annual fee for all residents) provides grants, including installation and 5 years of maintenance, for homeowners and businesses to upgrade their onsite systems to remove nitrogen. The current priority is to address failing systems in critical areas defined as within 1,000 feet of tidal waters and tidal wetlands of the Chesapeake Bay and its tributaries, then other failing systems. Maryland's regulatory program has performance-based standards for advanced treatment systems greater than 5,000 gallons per day, and operating permits to monitor performance. As of October 1, 2009, all replacement and new systems in critical areas must remove nitrogen.

Delaware's Department of Natural Resources and Environmental Control (DNREC) requires service providers to be licensed and permitted, and it approves use of innovative and alternative systems under operating permits. Delaware has developed a marketing strategy that uses workshops, television messages, and nonprofit and community organizations to increase consumer awareness and participation in DNREC's innovative septic loan program for system repair and replacement.

What EPA Could Do in the Chesapeake Bay Watershed

EPA would develop a model state program for reducing nitrogen loadings from onsite systems that the state health and environmental departments would implement. To demonstrate effectiveness, a pilot project could be established in a local jurisdiction. Elements of such a model program could include the following:

- A database tracking system to help inventory and assess conditions such as performance and growth
- Requiring nitrogen-reducing upgrades or retrofits of existing onsite systems in designated priority areas (e.g., Maryland's Critical Areas)
- Requiring all newly developed communities and densely populated areas to use cluster systems employing advanced nitrogen-removal technology together with responsible management entities

- Requiring that all new or redeveloped individual properties have nitrogen-removal systems installed
- Requiring that all failing systems be replaced or upgraded
- Requiring maintenance contracts with trained and certified operators for all nitrogen-removal systems
- Promoting connections to sewers where cost-effective and environmentally practicable
- Using fees to establish a fund for upgrading systems in priority areas, establish management entities, and/or to purchase nutrient reductions from other source categories with lower costs (beyond what is already necessary for that source to meet water quality standards) where onsite systems are not cost-effective

As part of the model program, EPA would also encourage states and locals to develop growth management and land use policies that proactively direct onsite system usage to areas with less environmental impact, given that onsite system use increases with population growth.

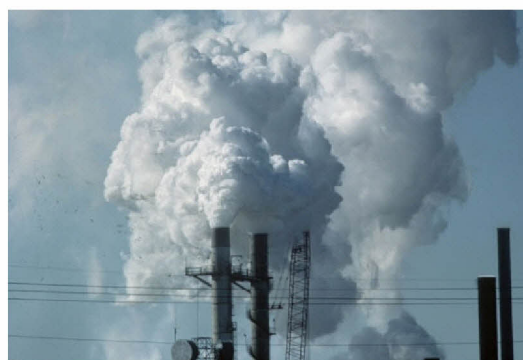
EPA would communicate its expectation that jurisdictions achieve onsite system load allocations within the Bay TMDL through state regulations, permits, or enforceable agreements that would yield the necessary reductions with commitments to dates by which any necessary regulations or other instruments would be established and implemented.⁸

EPA would track state progress in adopting this model state program or similarly effective programs. In addition, EPA could issue biannual report cards evaluating jurisdictions' and/or counties' progress toward reducing nitrogen loads from onsite systems. Such evaluations could be by jurisdiction, watershed, county, and/or drainage area of each impaired tidal segment in the Bay TMDL. The report card might provide positive recognition for entities that exceeded their milestones, and draw attention to areas that have achieved less than a certain percentage of their two-year milestones or use a similar, alternative, transparent grading system to rate each entity's performance.

Atmospheric Deposition of Nitrogen

Background on Atmospheric Deposition of Nitrogen

Reactive nitrogen in the atmosphere includes all forms of nitrogen except N_2 gas and results in deposition of nitrogen oxides (NO_x) and reduced nitrogen (NH_x as ammonia or ammonium). Deposition can be wet (e.g., rain and snow), occult (e.g., clouds and fog), or dry (e.g., gases and particles). Sources of NO_x include electric generating units, other industrial stationary



Atmospheric deposition of nitrogen from smokestacks (Source: EPA Region 2).

⁸ In states that are not signatories of the *Chesapeake 2000* agreement, EPA would strongly encourage that any reductions in loads from onsite systems in Watershed Implementation Plans be achieved through enforceable or otherwise binding commitments. However, the Agency would accept an alternative program for fulfilling commitments if non-signatory jurisdictions can provide assurance that load allocations for onsite systems will be achieved and maintained and jurisdictions can demonstrate progress toward these goals through two-year milestones.

sources, on- and off-road mobile sources (cars, trucks, ships, and tractors), lightning, and soils. Sources of ammonia include AFOs, fertilized fields, vehicles, and industrial stationary sources.

The NO_x airshed for the Chesapeake Bay is designated as those areas that contribute 75 percent of the air emission sources that result in pollutants being deposited in the Chesapeake Bay watershed and directly on the Bay's tidal waters.

The airshed encompasses, but is much larger than, the Bay watershed, extending across 17 states and one Canadian province, a total area of about 570,000 square miles.

Within the Chesapeake Bay watershed, inorganic forms of nitrogen deposition have been modeled and monitored. Organic forms have not been well quantified. Of the inorganic nitrogen deposited from the air to the Chesapeake Bay watershed in 2002, approximately 67 percent is oxidized nitrogen due to air emissions of NO_x. The remaining 33 percent is in the form of reduced nitrogen from emissions of ammonia. Significant uncertainty remains in the ammonia emissions inventory, which will be improved with further emission and ambient measurements.

In 2002 about 87 million pounds (19 percent) of nitrogen load deposited on the watershed was delivered to the Bay. An additional 22 million pounds of nitrogen were atmospherically deposited directly onto the surface of the tidal Bay's waters.

Ammonia emissions, in 2002, were estimated to contribute approximately 147 of the 452 million pounds of nitrogen atmospheric deposition to the Bay watershed. About 80 percent of the deposited ammonia loads were estimated to originate from agricultural operations, and 20 percent were from mobile and industrial sources, fires, and other sources.

EPA's Office of Air and Radiation develops regulations and programs to reduce nitrogen concentrations in ambient air, resulting in decreased atmospheric deposition. Most of these regulations are national in scope but provide significant reductions in nitrogen deposition to the Chesapeake Bay and its watershed. Many regulations have been fully implemented since the inception of the Chesapeake Bay Program in 1983, while others are still being implemented or are proposed.

The most prominent examples of programs that have or will result in nitrogen emission controls are the following:

- **Clean Air Interstate Rule (CAIR):** Developed to control emissions from electric utilities to help states meet ozone and fine particulate standards
- **National Ambient Air Quality Standards:** Designed to improve air quality for the protection of human health and welfare, including standards for ozone, PM_{2.5}, and NO_x
- **Stationary Source Rules:** Multiple rules under the section 129 solid waste combustion standards and the section 111 new source performance standards (NSPS) have NO_x reduction benefits
- **Mobile Source Rules:** Implementing a number of regulations that will continue to dramatically reduce NO_x from a variety of mobile sources, including cars, trucks, buses, trains, ships, and off-road vehicles

- **State and Local Greenhouse Gas and Energy Programs:** As these programs promote greater use of renewable energy in electricity generation and greater energy efficiency in vehicles, homes and businesses, those efforts will affect fuel usage and, accordingly, act to decrease NO_x emissions

Reductions in nitrogen deposition have been estimated from 1985 to 2002 and for 2010 and 2020 on the basis of projected air modeling analysis scenarios. The future year scenarios reflect emission reductions from national control programs for both stationary and mobile sources, including the CAIR, the Tier-2 Light-Duty Vehicle Rule, the Nonroad Engine Rule, the Heavy-Duty Diesel Engine Rule, and the Locomotive/Marine Engine Rule. Although CAIR has been remanded to EPA, it will remain in place pending a rulemaking to replace it. It is yet unclear how the replacement rule will compare to the remanded rule. However, EPA anticipates NO_x emission reductions close to those originally projected. In the aggregate, the overall TN deposition to the Chesapeake Bay watershed is projected to decline from 1985 levels by 39 percent by 2010, and 46 percent by 2020 as a result of the projected decreases in NO_x driven by regulation and factoring in stable to increasing ammonia emissions throughout the Eastern United States.

In terms of atmospheric deposition of nitrogen delivered to the Bay from the watershed or deposited directly onto the tidal Bay surface waters, current modeling projections, which are based on regulations in place or being proposed at the time, predict reductions of about 40 million pounds per year in nitrogen deposition to the watershed from 2010 to 2020. Implementing mobile source rules through 2025 would provide even more reduction. The most recent runs of the Chesapeake Bay watershed model estimate that the 40 million pounds reduction from 2010 to 2020 of deposition to the watershed would translate to a reduction of about 5 million pounds per year of delivered load and another 2 million pounds of decreased deposition directly to the surface waters of Chesapeake Bay. These estimates include the original assumptions for reductions from CAIR and various mobile source rules. Updated emission inventories and estimates fully considering newer rules will further improve the reduction estimates.

EPA's Office of Air and Radiation also participates in monitoring ambient air, deposition, and emissions to better quantify air quality trends and success of nitrogen emission control programs. Some of the current initiatives include the following:

- a) EPA is providing technical oversight of an industry sponsored monitoring study of AFOs, called the National Air Emissions Monitoring Study (NAEMS). Emissions from animal agricultural operations are being monitored for several pollutants including ammonia. This study will complete data collection in early 2010, followed by development of an emissions estimating methodology within 18 months. EPA will use the study results to aid in assessing appropriate actions for AFOs, which could include actions to reduce nitrogen deposition.
- b) EPA is collaborating with the National Atmospheric Deposition Program (NADP) to monitor ammonia concentrations as part of a pilot project at 21 NADP wet deposition sites. NADP is a multiagency monitoring consortium, including USDA, NOAA, other federal agencies, states, tribes, academic institutions, and industry. The goal of this effort is to represent temporal and spatial long-term trends in ammonia concentrations, provide information to assess changes in ecosystems and agricultural activities, and provide benchmarks for air quality goals.

Both the NAEMS and the NADP and other monitoring data will be very useful in improving the national emissions inventory and assessing the accuracy of our transport and deposition models. With these data, EPA would perform the following:

- Update the emissions inventory with information from new nitrogen emission control programs
- Model the nitrogen transport and deposition onto the Chesapeake Bay and watershed
- Model the fate and transport of nitrogen across the watershed as it is delivered to the Bay
- Estimate future nitrogen load reductions as a result of emission control programs
- Use the results in the development of the Bay TMDL
- Determine what further reductions in nitrogen deposition are necessary to meet the atmospheric deposition portion of the Bay TMDL's load allocations

What EPA Could Do in the Chesapeake Bay Watershed

EPA would implement its agenda described above for reducing nitrogen emissions. On the basis of a modified 2002 inventory of planned actions, this approach would result in at least an estimated additional 7 million pounds of reduction in nitrogen loading to the Bay between 2010 and 2020 (5 million pounds via indirect deposition on land and upstream waters and 2 million pounds via direct deposition to the surface waters of the Bay).

EPA is in the process of developing and implementing a number of regulations and programs that will continue to reduce nitrogen from a variety of stationary and mobile sources.

EPA is developing three rules that could affect ambient air levels of NO_x and, therefore, the deposition of nitrogen: (1) a replacement rule for the court-remanded CAIR, (2) the reconsideration of the ozone standard that was promulgated in 2008, and (3) the development of a secondary standard for oxides of nitrogen and sulfur.

EPA is implementing the NSPS for stationary spark ignition engines and finalizing the proposed amendments to the national emission standards for stationary reciprocating internal combustion engines (RICE).

EPA is completing implementation of the following mobile source rules and programs: Light-Duty Tier 2 Rule, the Clean Heavy-Duty Truck and Bus Rule, the Clean Air Nonroad Diesel—Tier 4 Rule, four Marine-Related NO_x Reductions Programs, the Locomotive and Marine Diesel Rule, the Non-road Large and Small Spark-Ignition Engines Programs, the Coordinated Strategy for Control of Emissions from Ocean-Going Vessels, and the Voluntary Clean Diesel Programs.

EPA would continue working to update and improve the national emissions inventory, improve modeling of ammonia deposition, and accurately project reductions in TN deposition from the most recent proposed regulations and standards.

EPA would establish air deposition allocations as part of the load allocations for the Bay TMDL.

EPA would analyze whether additional reductions are needed to meet the air deposition load allocations developed under the Bay TMDL.

By establishing and adopting each new set of federal two-year milestones, EPA would reevaluate ongoing and planned regulations and actions for reducing nitrogen emissions and deposition and consider whether additional actions are warranted.

EPA Action to Improve Compliance

To address noncompliance with existing environmental laws and associated environmental effects on this watershed, EPA has developed a draft Chesapeake Bay Compliance and Enforcement Strategy (Strategy), which guides the use of EPA's compliance and enforcement tools to target sources of pollution impairing the Bay watershed (see the attached draft Strategy in Appendix 1).

Urban/suburban stormwater runoff delivers a large load of nutrients and sediment to the Bay accounting for approximately 10 percent of nitrogen, 31 percent of phosphorus, and 19 percent of sediment. However, most of the nutrients and sediment discharged to the Bay in urban/suburban stormwater runoff is discharged through stormwater outfalls that are not in designated MS4 areas or represent pre-1986 development and, thus, not specifically regulated by the CWA's NPDES program. Only 2 percent of the nitrogen, 6 percent of the phosphorus, and 4 percent of sediment delivered to the Bay through urban/suburban stormwater discharge outfalls are regulated by EPA and the Bay states under the NPDES MS4 program. In addition, about one-half of the nitrogen and one-half of phosphorus from agriculture is from animal manure, of which only about one-third is regulated (contributing 6 percent of nitrogen and 8 percent of phosphorus delivered to the Bay). The remaining nitrogen and phosphorus from agriculture is from non-animal agriculture and smaller animal operations or emissions, which are not federally regulated. Thus, while EPA regulates pollution discharges from some of those sources, including CAFOs and MS4s, through the CWA NPDES permitting program and regulates other sources through the CAA, many sources are not subject to federal environmental regulations, including row crop agricultural operations and suburban stormwater runoff outside specific municipal stormwater sewersheds.

In addition to being hampered by the limited universe of regulated pollution sources, EPA's ability to take enforcement action in a number of key sectors is further compromised by terms of existing permits that lack specificity. For example, MS4s are not typical *end-of-pipe* permits with clearly defined numeric effluent limits. Instead, permit conditions often emphasize actions that should be taken to achieve certain outcomes and are frequently written with imprecise provisions. Without expanded regulatory coverage and stronger permit requirements, compliance and enforcement tools will not fix the Bay's pollution problems.

The magnitude of efforts needed to achieve the Bay states' water quality standards is significant and requires a new generation of federal and state regulatory tools and actions. Many of the programmatic and regulatory recommendations in this report could require additional time to develop and implement before pollutant reductions needed for a healthy Chesapeake Bay are realized. In the meantime, several enforcement tools and actions can be used now. For example, under existing statutory enforcement and/or endangerment authorities, as well as permitting regulations (that would inform remedies), EPA has tools to do, among other things, the following:

- Designate AFOs as CAFOs, making them subject to permitting requirements
- Audit, inspect, and provide compliance assistance to (or take enforcement against) MS4s to improve best management practices and stormwater management plans

- Enforce stormwater requirements at large construction sites to reduce sediment
- Enforce new source review, NSPS, and state implementation plan requirements at stationary sources and mobile source regulations at port facilities, warehouses, and construction sites to reduce NO_x emissions
- Monitor compliance with major milestones for installing controls at wastewater treatment plants and take appropriate enforcement
- Achieve pollutant reductions through strategic use of endangerment authorities
- Enhance effectiveness in overseeing state enforcement programs and initiate supportive federal enforcement actions, as appropriate
- Seek to ensure that all CAFOs that discharge or propose to discharge obtain NPDES permit coverage
- With other EPA, state, and federal partners, engage in education and outreach to the CAFO/AFO community about statutory and regulatory requirements
- Target cleanup activities at hazardous-waste sites identified as contributing to specific impairments to water quality in the Bay

Given available environmental enforcement authorities, EPA's strategic use of compliance and enforcement tools likely can assure only modest nutrient and sediment pollution reductions to the Bay acting alone. However, EPA believes that strategic enforcement efforts aimed at key regulated sectors and pollutants affecting the Bay will raise visibility and awareness of the importance of a rigorous commitment to strong compliance, stewardship, and accountability by the regulated community regarding the health of the nation's largest estuary. Compliance and enforcement efforts would continue into the future after EPA develops new environmental requirements that expand coverage of existing permitting programs and establish new, enhanced standards of performance for preventing pollutants from entering the Bay's watershed.

The draft Strategy is a multiyear, multistate, multimedia strategy designed to augment and enhance existing work to identify and address violations of federal environmental laws resulting in nutrient and sediment pollution in targeted impaired watersheds. The Strategy provides a focused and ambitious plan for addressing pollution sources, both in the Bay's watershed and the airshed. The Strategy identifies industrial, municipal, and agricultural sources releasing significant amounts of nitrogen, phosphorus, sediment, and other pollutants to impaired watersheds in the Bay in excess of amounts allowed by the CWA and the CAA and other applicable environmental laws.

The draft Strategy examines watersheds in the larger Bay watershed and identifies nutrient and sediment impaired segments of those watersheds, as well as significant regulated sources discharging the pollutants and other contaminants with potential noncompliance problems. Regulated sources in noncompliance that are contributing to impairment of the identified watersheds would be systematically addressed in accordance with the Strategy.

The draft Strategy analyzes existing data from a variety of sources to target key regulated sectors identified as contributing significant amounts of nitrogen, phosphorous, and sediment loadings and other contaminants to impaired watersheds in the Bay. For each of the sectors, EPA would examine specific watersheds impaired by nitrogen, phosphorous, sediment, and other

contaminants, as well as the regulated sources in those watersheds, and the sources' compliance status. The key sectors are the following:

- CAFOs
- Municipal and industrial wastewater facilities
- Stormwater NPDES point sources, including MS4s and stormwater discharges from construction sites and other NPDES-regulated, industrial facilities
- Air deposition sources of nitrogen regulated under the CAA, including power plants

In addition, the Strategy identifies appropriate opportunities for compliance and enforcement activities related to the CWA section 404 program regulating dredge and fill operations, federal facilities, and Superfund sites, including remedial action and removal sites, and Resource Conservation and Recovery Act (RCRA) corrective action facilities.

Finally, the Strategy would examine opportunities for using EPA's imminent and substantial endangerment authorities, including CWA section 504, section 1431 of SDWA, section 7003 of RCRA, section 106 of the Comprehensive Environmental Response, Compensation, and Liability Act, and section 303 of the CAA to address significant pollution problems affecting the Bay.

EPA Actions to Reduce Toxic Pollution in the Bay

While the water quality directive in the Executive Order and this report focus on nutrient and sediment pollution, EPA recognizes that the Chesapeake Bay and its tributaries, particularly its urbanized rivers, are also threatened by toxic chemicals. In 2006 the Chesapeake Bay Program conducted an assessment for toxic chemicals and determined that organic chemicals such as PCBs, polycyclic aromatic hydrocarbons (PAHs), pesticides, and endocrine-disrupting compounds (estrogens and pharmaceuticals) are a high-priority concern. The risks to Chesapeake Bay living resources from those pollutants extend to people who eat fish caught from the Bay because certain pollutants such as PCBs and mercury accumulate in fish tissue. For that reason, mercury has also been identified as a high-priority toxic chemical.

EPA's recommendations, described previously, to strengthen stormwater regulations and permits would have the additional benefit of controlling contaminant flow from the land, including oils and greases, metals, PAHs, and mercury from air deposition. EPA's draft compliance and enforcement strategy would also address stormwater discharges.

EPA's draft compliance and enforcement strategy would also address contaminants such as PCBs and PAHs. EPA would focus its efforts in three geographic areas: (1) the Elizabeth River; (2) the Anacostia River; and (3) the Baltimore Harbor/Patapsco River. Those areas have been identified as the waters most affected by toxic contaminants and contain current or historical RCRA facilities and Superfund sites. EPA would use Superfund and RCRA authorities and work with the states and federal partners to reduce the effect of hazardous substances from those areas on the Bay.

Under the CAA, EPA regulates 187 toxic air pollutants. EPA is substantially reducing emissions of these air toxics, including mercury, through maximum achievable control technology (MACT) standards, the new source review program, and mobile source programs. MACT standards target specific industries (e.g., coal combustion, cement production, waste incineration) known to emit mercury and other toxics listed in the CAA (e.g., PCBs). On the basis of an assessment of the risk remaining after application of MACT standards, EPA is to promulgate more stringent

standards for those industries if necessary to protect public health with an ample margin of safety or to prevent adverse environmental effects. Programs that address specific sources in the United States include a number of rules that EPA has adopted over the past several years but have not yet been fully implemented.

In addition to those recommended new efforts, EPA and partner states will continue to implement a number of ongoing efforts to reduce toxic pollution to the Bay and its tributary waters. EPA and states will establish TMDLs for local streams in the watershed and larger-scale TMDLs for listed chemical impairments (e.g., PCBs in the Potomac Basin). EPA will ensure conformance of NPDES permits to the TMDL-based allocations.

EPA will provide leadership in the restoration of heavily affected urban rivers. EPA will lead the effort to define a Toxics Management Plan for the Anacostia River as part of the November 2010 Anacostia Restoration Plan being prepared by the USACE. Continued source control, contaminated sediment remediation and land-based, waste site cleanups would be elements of the strategic plan for this priority watershed. EPA Region 3 has designated the Elizabeth River as a priority urban river, and it will receive significant attention in the coming years. Finally, in Baltimore Harbor, EPA Region 3 will focus on ongoing removal, remedial, and corrective action activities at sites looking for opportunities to accelerate cleanups.

Recent action by the District of Columbia to reduce PAHs in local waters by banning the sale and use of coal-tar-based pavement sealant is a potential model for use in other areas of the watershed. In addition, EPA would lead a feasibility analysis regarding the potential phase-out of all equipment containing PCBs on federal lands by a date such as 2025.

EPA is concerned about the potential risks posed by contaminants of emerging concern such as endocrine disruptors (e.g., pharmaceuticals and personal care products). EPA is implementing a four-pronged strategy to improve the science and public understanding regarding the occurrence and potential effects of those chemicals on aquatic life and human health. Ongoing EPA efforts include developing analytical methods and a methodology for assessing risks to aquatic life and public health. EPA has recently completed or is conducting a number of studies to better understand the occurrence and concentration of the chemicals in POTW effluents, biosolids, and fish tissue. EPA is also studying how the healthcare industry manages unused pharmaceuticals and expects to recommend best management practices. Additionally, the Agency is promoting *take-back* programs for unused or expired pharmaceuticals. When sufficient information is available, EPA would take regulatory action as appropriate to reduce any threats posed by the chemicals.

EPA is also concerned about potential risks posed by total dissolved solids discharges related to resource extraction activities, particularly natural gas exploration and mine-pool drawdown, and will take appropriate actions to characterize and address those risks. EPA is working closely with state partners to investigate impacts and implement measures for most effectively regulating treatment and disposal of brine, mine-pool effluent, and waste streams generated at coal-fired power plant flue gas desulfurization units. EPA is also exploring the possible transport of Naturally Occurring Radioactive Materials through treatment and disposal of brine generated from natural gas exploration in the Marcellus Shale.

Timing of EPA Actions

The Executive Order directs agencies to consult with the Federal Leadership Committee and, to the extent practicable and authorized under existing authorities, begin implementing core elements of their protection and restoration programs and strategies as soon as possible and before a final strategy is released. While EPA develops new regulations and programs, the Agency will also take action using a range of existing authorities to reduce nutrient and sediment pollution to the Bay.

EPA Actions to Hold Itself Accountable

As described in Part I above, EPA would hold itself accountable through a series of two-year milestones for accomplishing the actions identified in this report and reporting transparently on our progress just as the seven Chesapeake Bay jurisdictions are doing. Specifically, EPA would track its progress toward developing and implementing stormwater and CAFO rules; developing and implementing more stringent reductions of ammonia and NO_x emissions; reducing stormwater loads from federal facilities and lands; and other actions described in this document.

Part III: Enhanced Partnership for a *Healthy Waters—Thriving Agriculture Initiative*

EPA believes that maintaining the viability of agriculture is an essential component to sustaining ecosystems in the Bay. Environmentally sound farming is a preferred land use in the region, and the Agency is committed to strong partnerships and collaboration with states and local governments, urban, suburban and rural communities, and the private sector to achieve environmental objectives for the Bay.

Programs that empower voluntary actions to protect the Bay through incentives and technical and financial assistance are a fundamental part of improving the Bay. EPA is committed to developing and applying new technologies and ecosystems services markets that can provide new revenue opportunities for farmers and their communities, increase rural wealth, and sustain the restoration of the Bay.

EPA also believes that a sound system of accountability is critical to ensuring that goals for the Bay are met. That system would entail binding commitments from state and local governments, as well as federal agencies and the private sector to implement measures that ensure that we meet environmental goals for the Bay. Such a system also requires that federal agencies be accountable for delivering the resources and assistance necessary for restoring and protecting the Bay.

To further those goals, EPA would work with USDA and other federal and state partners to design and implement a series of ambitious programs to secure widespread implementation of conservation practices throughout the Chesapeake. In doing so, we would be able to generate significant progress in addressing water quality and agricultural issues even as essential accountability measures are being developed.

Key elements of the partnership include the following:

- **Target resources in priority watersheds.** Strategically expand intensive use of key conservation practices in the high-priority agricultural watersheds by aligning EPA resources with USDA and other partners to engage farmers in nutrient and sediment reduction efforts.

The intent of this coordinated effort is to achieve significant reductions of nutrients and sediments and demonstrate the value of this targeted approach. By setting conservation goals, engaging more farmers, and providing sufficient technical assistance to help farmers implement conservation practices, this approach will have broad benefits to water quality in watersheds throughout the Bay.

- **Establish centerpiece projects to address agricultural challenges.** Align federal, state, and private resources and partnerships to establish high-profile projects to tackle some of the most challenging and critical agricultural issues facing communities in the Bay.

The intent of these projects is to catalyze collective action in developing sustainable solutions to key agricultural challenges such as keeping livestock out of streams, engaging small dairy operations in conservation, and addressing phosphorus imbalances in areas with high concentrations of animal operations.

- **Collaborate in developing next-generation conservation planning tools.** Work with federal, state, agricultural and research partners to develop the next generation of conservation planning tools in the next eight months and commit resources and expertise to implement the tools. These conservation planning tools will play a key role in helping the states meet Chesapeake Bay water quality goals.
- **Develop technologies.** Align EPA programs and resources with USDA efforts to achieve water quality improvements by developing critically needed tools and technologies to help farmers meet their conservation and farm operation objectives. EPA would seek opportunities to align its resources with USDA to fund technology development to assist the agriculture industry in reducing the effects of livestock waste.

In achieving those ambitious objectives, EPA would work with state and federal partners to identify and align resources from its relevant programs—e.g., 319 program, SRF, CWA section 117, State Innovation Grants, and STAR Grants—in concert with USDA's Farm Bill programs and resources as administered by Natural Resources Conservation Service, Farm Service Agency, and other mission areas. EPA's intention would be to develop and demonstrate an increased capacity to implement key conservation practices in priority agricultural watersheds to substantially reduce nutrient and sediment loads to the Chesapeake Bay through enhanced coordination of our resources and partnerships. Through the alignment of resources and continued work with federal, state, and local partners, EPA would intend to enable farmers and communities to accelerate the wider adoption of conservation practices and support innovative efforts to address some of the most pressing challenges to meeting water quality and agricultural goals in the Bay watershed.

Centerpiece Projects: Meeting challenges—Creating solutions

Meeting the challenges in the Bay region involves resolving a combination of conservation, economic, and sustainability issues that require a concerted effort to engage the creativity and commitment of federal, state, and local partners. Several important opportunities exist for coordinated action by USDA and EPA in the region, such as the following:

- **Small dairies**—Small-dairy farmers face unique problems in implementing conservation practices at the same time that they face intense economic pressures. Providing creative ways to help them incorporate conservation measures while improving their financial position would provide an important benefit to rural communities and the Bay.
- **Livestock exclusion**—New and innovative approaches have provided farmers with flexible options for keeping livestock out of streams. Expanding access of technical and financial assistance to farmers throughout the watershed to exclude livestock from streams would dramatically improve water quality and improve farm operations.
- **Addressing phosphorus imbalances in areas with high concentrations of animal operations**—Providing technical and financial assistance to help farmers manage excess manure will be important for long-term sustainability of agricultural operations and the health of the Bay.

With a coordinated effort on those and other issues, USDA and EPA can make the resources available that are necessary for a successful and sustainable solution that has significant benefits for farming communities and the health of the Bay.

Draft Chesapeake Bay Compliance and Enforcement Strategy

I. Introduction

The Chesapeake Bay (Bay) is North America's largest and most biologically diverse estuary, home to more than 3,700 species of plants and animals. It is about 200 miles long, contains more than 11,000 miles of tidal shoreline, and is fed by 100,000 creeks, streams, and rivers. The watershed spreads over 64,000 square miles and includes parts of six states—Delaware, Maryland, New York, Pennsylvania, Virginia, and West Virginia—and the entire District of Columbia. As of 2007, approximately 17 million people lived in the Bay watershed. The Bay provides significant economic and recreational benefits, estimated to exceed \$33 billion annually, to the watershed's population.¹ The Bay's waters are threatened by pollution from a variety of sources. To address noncompliance with environmental laws and associated environmental impacts to this watershed, the U.S. Environmental Protection agency (EPA) has developed this Chesapeake Bay Compliance and Enforcement Strategy (Strategy), which guides the use of EPA's compliance and enforcement tools to target sources of pollution impairing the Bay watershed.

a. Current Health of the Bay

Multiple federal, state, and local entities have been working to improve the health of the Bay. While total pollution levels have declined since 1985, most of the Bay's waters are degraded and are incapable of fully supporting fishing, crabbing, or recreational activities. Algal blooms fed by nutrient pollution block sunlight from reaching underwater Bay grasses and lead to low oxygen levels in the water. Suspended sediment from urban development, agricultural lands, and some natural sources is carried into the Bay and clouds its waters. Portions of the Bay and its tidal tributaries are contaminated with chemical pollutants that can be found in fish tissue. The Bay's critical habitats and food web are at risk. Nutrient and sediment runoff have harmed Bay grasses and bottom habitat, while disproportionate algae growth has pushed the Bay food web out of balance. The Bay's habitats and lower food web (benthic and plankton communities) are functioning at 45 percent of desired levels. Many of the Bay's fish and shellfish populations are below historical levels. The blue crab population continues to be low, and the stock is not rebuilding; oyster restoration efforts are hampered by disease, and the stock remains at low levels; American shad continues at depressed levels; the menhaden population in the Bay is low despite healthy populations along the Atlantic coast; and striped bass are plentiful, but there is concern about disease and nutrition. The Bay's fish and shellfish populations are at 48 percent of desired levels. Fish kills occur in a number of rivers leading to the Bay.²

b. Significant Pollutants and Sources

The greatest pollution threats to the Bay are from nutrients (nitrogen and phosphorus) and sediment. Such pollutants come from many sources, including agricultural operations, wastewater treatment facilities, urban stormwater runoff, and air deposition from power plants and cars. Agricultural sources contribute the largest nutrient and sediment pollution in the watershed, accounting for approximately 38 percent of nitrogen loading, 45 percent of phosphorus loading, and 60 percent of the sediment loading. About one-half of the nitrogen from agriculture is from animal manure. Municipal and industrial wastewater treatment

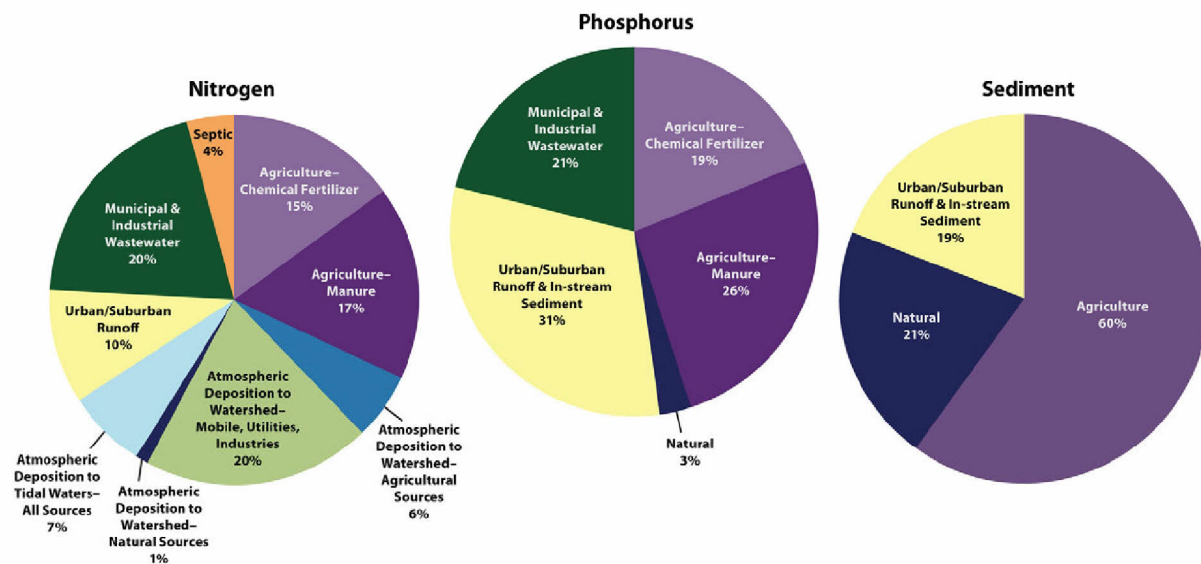
¹ EPA, Office of Inspector Gen., Rep. No. 08-P-0199, *EPA Needs to Better Report Chesapeake Bay Challenges: A Summary Report 3* (July 14, 2008), at <http://www.epa.gov/oig/reports/2008/20080714-08-P-0199.pdf>.

² Chesapeake Bay Program, *Bay Barometer: A Health and Restoration Assessment of the Chesapeake Bay and Watershed in 2008*, CBP/TRS-293-09, EPA-903-R-09-001, (March 2009), at http://www.chesapeakebay.net/content/publications/cbp_34915.pdf.

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facilities account for approximately 20 percent of the nutrient loading to the Bay. Urban and suburban stormwater runoff accounts for approximately 10 percent of the nitrogen loading, 31 percent of phosphorous loading, and 19 percent of sediment loading. Population growth and development and the rapid increase in the amount of impervious surfaces have caused stormwater pollution to be a growing concern.

Air pollution contributes approximately 34 percent of the total nitrogen loading to the Bay.³ Modeling estimates based on projected emissions for 2020 indicate that the relative contributions of different source sectors of airborne nitrogen oxide (NO_x) emissions to oxidized nitrogen deposition to the Bay watershed will be 26 percent from on-road mobile sources; 21 percent from non-road/marine/construction mobile sources; 17 percent from industrial sources; 15 percent from power plants; 12 percent from residential and commercial sources; and 9 percent from other sources.⁴ Figure A-1 shows relative responsibility for sector loadings to the Bay.



Note: Does not include loads from tidal shoreline erosion or the ocean. Urban/suburban runoff loads due to atmospheric deposition are included under atmospheric deposition loads. Wastewater loads are based on measured discharges; other loads are based on an average hydrology year using the Chesapeake Bay Program Airshed Model and Watershed Model Phase 4.3.

Figure A-1. Relative responsibility for pollution loads to the Bay.

Other pollutants of concern in the Bay include hazardous wastes, like PCBs, polycyclic aromatic hydrocarbins (PAHs), and metals in river sediment. The contaminants can leach into the groundwater or discharge directly into the Bay from different sources in the watershed and airshed, such as industrial facilities, hazardous waste sites, landfills, urban stormwater runoff, and mobile and stationary air sources.

³ Chesapeake Bay Program, *Questions and Answers from the Senate Environment and Public Works Committee Hearing on the Chesapeake Bay on April 20, 2009* (June 3, 2009).

⁴ Robin Dennis, *Report on Relative Responsibility Assessment of Sectors and States: Oxidized-Nitrogen Deposition in 2020* (final numbers), Chesapeake Bay Modeling Subcommittee Meeting, Annapolis, MD. (April 8, 2008).

II. Compliance and Enforcement Role

In the Bay watershed, only a portion of the nutrient and sediment pollution is regulated under the Clean Water Act (CWA) or the Clean Air Act (CAA). According to estimates by EPA's Chesapeake Bay Program Office, at least 49 percent of total nitrogen, 35 percent of total phosphorus, and 4 percent of total sediment is subject to federal regulation. The best modeling indicates that nitrogen pollution to the Chesapeake Bay must be reduced by 30 percent, and phosphorus pollution must be reduced by 8 percent to meet water quality standards. Achieving that level of reduction will require significant and sustained reductions by all source categories, including agriculture. Yet, even full compliance with existing regulations will not result in the necessary pollution reductions to restore the health of the Bay.

Agricultural sources and urban stormwater runoff account for about half of the nitrogen and three-quarters of the phosphorus pollution to the Bay. Air deposition of nitrogen from stationary and mobile sources accounts for about one-third of the nitrogen pollution. EPA regulates pollution discharges from some of these sources, including concentrated animal feeding operations (CAFOs) and municipal separate storm sewer systems (MS4s), through the CWA National Pollutant Discharge Elimination System (NPDES) permitting program and regulates other sources through the CAA. Many sources, however, are not subject to federal environmental regulations, including row crop agricultural operations and suburban stormwater runoff outside specific municipal stormwater sewersheds. In addition to being hampered by the limited universe of regulated pollution sources, EPA's ability to take enforcement action in a number of key sectors is further compromised by terms of existing permits that lack specificity. For example, MS4s are not typical *end-of-pipe* permits with clearly defined numeric effluent limits. Instead, permit conditions often emphasize actions that should be taken to achieve certain outcomes and are frequently written with imprecise provisions. Without expanded regulatory coverage and stronger permit requirements, compliance and enforcement tools will not fix the Bay's pollution problems.

The magnitude of efforts needed to achieve Bay water quality standards is significant and requires a new generation of federal and state regulatory tools and actions. These could include the following: (1) finalizing total maximum daily loads (TMDLs) throughout the Bay watershed; (2) expanding the definition of CAFO to encompass smaller animal feeding operations (AFOs); (3) defining more stringent permit conditions related to the land application of animal manure; (4) expanding NPDES stormwater regulations to apply to high-growth, urban/suburban areas; (5) creating more stringent permit conditions including standards for discharges of stormwater from new/redevelopment projects and retrofit criteria for large facilities with impervious surfaces such as shopping malls, roads, and parking lots; and (6) ensuring adequate, enforceable NPDES permits for MS4s.

Many of these programmatic and regulatory fixes could require additional time to develop and implement before pollutant reductions needed for a healthy Chesapeake Bay are realized. In the meantime, some enforcement tools and actions can be used now. For example, under existing statutory enforcement or endangerment authorities (or both), as well as permitting regulations (that would inform remedies), EPA has tools to do, among other things, the following:

- Designate AFOs as CAFOs, making them subject to permitting requirements
- Audit, inspect, and provide compliance assistance to (or take enforcement against) MS4s to improve best management practices and stormwater management plans

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- Enforce stormwater requirements at large construction sites to reduce sediment
- Enforce new source review, NSPS, and state implementation plan (SIP) requirements at stationary sources and mobile source regulations at port facilities, warehouses, and construction sites to reduce NO_x emissions
- Monitor compliance with major milestones for installing controls at wastewater treatment plants and take appropriate enforcement
- Achieve pollutant reductions through strategic use of endangerment authorities
- Enhance effectiveness in overseeing state enforcement programs and initiate supportive federal enforcement actions, as appropriate
- Seek to ensure that all CAFOs that discharge or propose to discharge obtain NPDES permit coverage
- With other EPA, state, and federal partners, engage in education and outreach to the CAFO/AFO community about statutory and regulatory requirements
- Pursue enforcement-led cleanup activities at hazardous-waste sites identified as contributing to specific impairments to water quality in the Bay

Given available environmental enforcement authorities, EPA's strategic use of compliance and enforcement tools likely can assure only modest nutrient and sediment pollution reductions to the Bay acting alone. However, EPA believes that strategic enforcement efforts aimed at key regulated sectors and pollutants affecting the Bay will raise visibility and awareness of the need for a rigorous commitment to strong compliance, stewardship, and accountability by the regulated community regarding the health of the nation's largest estuary. Compliance and enforcement efforts will continue into the future after EPA develops new environmental requirements that expand coverage of existing permitting programs and establish new, enhanced standards of performance for preventing pollutants from entering the Bay's watershed.

While EPA will continue to play an important enforcement role in the Bay states, the states themselves are the critical *cops on the beat*, conducting the bulk of environmental inspections and compliance assistance. As such, EPA would closely plan and coordinate compliance and enforcement efforts with its state (and commonwealth) partners around the Bay to ensure robust watershed-wide compliance and enforcement programs that establish clear expectations for the public and the regulated community regarding compliance.⁵ Through our coordinated efforts, EPA and state compliance and enforcement programs will strengthen efforts to ensure compliance. That complementary effort can identify innovative opportunities for using federal and state enforcement tools to promote sound management practices to reduce pollution to the Bay. If successful, such pilot approaches could also be used in other estuaries facing similar pollution assaults (e.g., Puget Sound, San Francisco Bay).

To enhance transparency, EPA is developing a Chesapeake Bay compliance and enforcement Web site where this Strategy and other relevant information related to compliance and enforcement will be posted, including the compliance status of facilities in the Bay watershed. The Web site is at www.epa.gov/compliance/civil/initiatives/chesapeakebay.html.

⁵ An EPA/state Planning, Communication, and Oversight plan will be developed pursuant to this Strategy.

III. Strategy

a. Overview

The Strategy is a multiyear, multistate, and multimedia strategy designed to augment and enhance existing work to identify and address violations of federal environmental laws resulting in nutrient and sediment pollution in targeted impaired watersheds. This Strategy provides a focused and ambitious plan for addressing pollution sources, both in the Bay's watershed and the airshed. The Strategy identifies the industrial, municipal, and agricultural sources releasing significant amounts of nitrogen, phosphorus, sediment, and other pollutants to impaired watersheds in the Bay in excess of amounts allowed by the CWA and the CAA and other applicable environmental laws.

b. Impaired Watershed Approach

The Strategy examines watersheds and identifies nutrient and sediment impaired segments of those watersheds, as well as significant regulated sources discharging these pollutants and other pollutants with potential noncompliance problems. Regulated sources in noncompliance that are contributing to impairment of the identified watersheds will be systematically addressed in accordance with the Strategy. The Strategy is designed around criteria that focus attention at the watershed level including criteria that consider the following:

- The extent of impairments from pollutants of concern
- The degree of excess nutrient and sediment loads
- The number and types of regulated sources located in the watershed segment (or depositing pollutants to that watershed for some air sources)
- The water quality rating (good, threatened, or impaired)
- The number of primary contact recreation beaches
- The number of shellfish beds/beaches closed
- Fish consumption advisories
- The magnitude of wetlands losses
- The prevalence of minority populations, populations disproportionately below the poverty line, or sensitive populations such as subsistence fishermen
- Urban rivers
- Site cleanup opportunities

The Strategy analyzes existing data from a variety of sources to target key regulated sectors identified as contributing significant amounts of nitrogen, phosphorous, sediment loadings, and other pollutants to impaired watersheds in the Bay when in noncompliance with current applicable environmental regulations. For each of the sectors, EPA will examine specific watersheds impaired by nitrogen, phosphorous, sediment, and other pollutants, as well as the regulated sources in those watersheds, and the sources' compliance status. The key sectors are as follows:

- CAFOs

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- Municipal and industrial wastewater facilities
- Stormwater NPDES point sources, including MS4s and stormwater discharges from construction sites and other regulated industrial facilities
- Air deposition sources of nitrogen regulated under the CAA, including power plants

In addition, the Strategy identifies appropriate opportunities for compliance and enforcement activities related to the CWA section 404 program regulating dredge and fill operations, federal facilities, and Superfund sites, including remedial action and removal sites and Resource Conservation and Recovery Act (RCRA) corrective action facilities.

EPA will examine the compliance records for facilities in the key sectors and which are in impaired watersheds including the following:

- The pattern and seriousness of noncompliance and whether the source is considered a high-priority violator
- The occurrence of un-permitted discharges
- Whether multiple facilities or sectors are operating under one owner/operator and in more than one state
- The volume and nature of the source's discharges

EPA will conduct further investigations and inspections of targeted facilities in selected watersheds; pursue appropriate enforcement actions to ensure compliance; and estimate pollutant-loading reductions for nitrogen, phosphorous, and sediment related to those completed actions. Under the Strategy, EPA will review the ongoing water and air protection work in the Bay watershed, much of which addresses some of the most significant discharges of pollutants to the Bay, and will focus on sources that have not yet been addressed consistent with this Strategy. To leverage EPA and states' limited compliance and enforcement resources, EPA will coordinate closely with the states in the Bay watershed on targeting and pursuing the most serious contributors to Bay impairment. Specific projections of enforcement and compliance activities will be developed, monitored, and readjusted as the work goes forward.

Finally, EPA will examine opportunities for the use of imminent and substantial endangerment authorities, including CWA section 504, section 1431 of the Safe Drinking Water Act, section 7003 of RCRA, section 106 of CERCLA, and section 303 of the CAA to address significant pollution problems affecting the Bay.

c. Sector Strategies

i. Concentrated Animal Feeding Operations

a. Overview

EPA will enhance efforts to protect the Chesapeake Bay by prescribing actions calculated to increase CAFOs' regulatory compliance and reduce their nutrient loads to the Bay. EPA will increase its visibility in the watershed by targeting enforcement actions and remedies at facilities located in geographic hot spots impaired for nutrients and sediment that are critical to the restoration of the Bay.

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b. Animal Agriculture

Agriculture is the single largest source of nutrients to the Chesapeake Bay. Agricultural operations deliver nitrogen and phosphorus to the Bay accounting for 38 percent of nitrogen and 45 percent of phosphorus.⁶ 17 percent of the nitrogen and 26 percent of phosphorus from agriculture is from animal manure, and an additional 6 percent of nitrogen delivered to the Bay comes from livestock and fertilized soil emissions. About one-third of animal manure is regulated (contributing 6 percent of nitrogen and 8 percent of phosphorus delivered to the Bay). The remaining nitrogen and phosphorus from agriculture is from non-animal agriculture (e.g., rowcrops) and smaller animal operations or emissions which are not subject to the regulatory restrictions imposed on CAFOs. Thus, EPA can only address a small portion of nutrients from animal agriculture pursuant to existing regulatory authority.

Three areas represent the greatest contributions of manure-based agricultural nutrient loads to the Bay: (1) *Delmarva Peninsula*: Delaware, and the Eastern Shores of Maryland and Virginia; poultry—broiler chickens—is the dominant industry sector; (2) *South-central Pennsylvania*: Susquehanna River watershed/Lancaster and York counties; dairy is the dominant industry sector; to a lesser extent, swine and poultry (broiler and egg-laying chickens) also operate in this priority area; and (3) *Shenandoah Valley*: Virginia and West Virginia; poultry—broiler chickens and turkeys—is the dominant industry sector; to a lesser extent, small- and medium-dairies and swine facilities also operate in this priority area. The watersheds in those areas suffer from significant nutrient imbalances and nutrient-related, local water quality impairments. Densely populated animal agriculture operations in these areas cause the highest agricultural nutrient loads to the Bay by comparison to other areas. Inconsistent implementation of sound nutrient management practices has resulted in manure over-application and nutrient loading.

c. Goal

The goal is to reduce nutrient loads to the Bay by addressing noncompliance and by focusing compliance and enforcement activities on facilities in three key areas—the Delmarva Peninsula, South-central Pennsylvania, and the Shenandoah Valley.

To achieve this goal EPA is preparing to (1) work with states to target implementation of the CAFO program to minimize CAFO nutrient effects on the Bay, specifically to investigate or inspect facilities that pose the most risk to the Bay watershed and take enforcement actions to compel compliance; (2) maximize the extent to which current state CAFO programs are achieving their intended water quality benefits by working with states to expand the permitted facility universe, issue sufficiently stringent permits, which should at a minimum require that nutrient management plans be based on existing soil saturation levels, and build sustainable programs for compliance monitoring and enforcement (e.g., undertake universe-identification and information-gathering activities, conduct joint and oversight inspections with state partners to ensure appropriate implementation of federal standards); and (3) seek to address CAFO air emissions and develop appropriate remedies to reduce emissions and their adverse water quality effect on the Bay.

Working with its state partners, EPA will address identified target facilities in the three key areas while implementing this Strategy. *Address* would mean that either EPA or the relevant state *has* inspected or investigated a facility and determined that the facility is in compliance, or that EPA or the relevant state initiates an appropriate enforcement action to compel compliance

⁶ This estimate assumes that these sources are in full compliance with their current NPDES permit requirements.

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or abate endangerments to drinking water sources or surface water. In general, *target facilities* will be those facilities that pose a high risk to the Chesapeake Bay watershed.

ii. Wastewater (Municipal and Industrial Wastewater)

a. Overview

Wastewater treatment facilities deliver large loads of nitrogen and phosphorous to the Bay, accounting for approximately 20 percent of nitrogen and 21 percent of phosphorus entering the watershed. Due largely to previous treatment plant upgrades, nitrogen and phosphorus loads discharged by significant municipal wastewater treatment facilities have decreased by 40 percent and 65 percent, respectively, since 1985. Most of the municipal and industrial wastewater treatment plants that remain significant sources of nutrients in the Bay watershed will require additional treatment upgrades and are on enforceable schedules to meet more stringent annual nutrient limits for total nitrogen and total phosphorus. EPA and Bay states will monitor compliance with major milestones for installing the required controls and would target facilities in violation of their schedules for appropriate enforcement to ensure that these nutrient control upgrades proceed according to permit schedules.

b. Goal

EPA is initially focusing on significant wastewater facilities that are under permit schedules for upgrading treatment, with the goal of addressing all facilities that are in significant noncompliance with their schedules. EPA will also monitor those wastewater treatment facilities that have monthly average nutrient limits, with the goal of addressing the most significant sources of excess nutrients. Once a treatment facility is upgraded as required by its NPDES permit and new annual limits for total nitrogen and total phosphorous become effective, under the Strategy, EPA and states would then focus on facilities that discharge excess nutrients as a result of noncompliance with the more stringent NPDES permit limits. EPA is working with the Bay states to address noncompliant facilities that are failing to comply with nutrient effluent limits and significantly affecting Bay water quality, including all facilities with violations that meet the criteria for significant noncompliance or SNC. In the context of these goals, *address* would mean that either EPA or the relevant state initiates an appropriate enforcement action in response to identified noncompliance.

To achieve these goals, EPA is working with states to effectively implement the NPDES program, using the full breadth of EPA and state compliance and enforcement tools. This coordination includes (1) continuing EPA's oversight of authorized state NPDES enforcement programs; (2) working closely with the Bay states to ensure timely and appropriate enforcement action is initiated in response to identified SNC violations for compliance schedules and permit limits; (3) working closely with the Bay states to identify and initiate enforcement action in response to other permit violations that are not identified as SNC but that have the potential to impair water quality; and (4) providing technical and legal assistance to the states where needed. As noted earlier, the Bay states conduct the bulk of the inspections and NPDES enforcement actions under their authorized NPDES programs. Under the Strategy, EPA is developing and would initiate enforcement actions where strategically appropriate, for example, where violators operate in more than one state, where high penalties are appropriate or the required injunctive relief is extensive, or where a higher profile enforcement action might be beneficial.

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iii. Stormwater

a. Overview

EPA will address discharges from regulated MS4s and stormwater discharges from construction sites and other priority regulated industrial facilities. That approach will enhance overall efforts to protect the Chesapeake Bay by focusing enforcement actions and remedies—including appropriate compliance assistance—on noncompliant MS4s, construction site operators, and priority industrial facilities in geographic hot spots that are critical to the Bay's restoration. Inspection and audit findings within MS4 boundaries will provide leverage for improving MS4 programs, as well as improving oversight and enforcement by other local entities responsible for inspecting construction sites. Inspection findings at construction sites and industrial facilities outside MS4 boundaries could provide information to support the designation of certain urban/suburban separate storm sewer systems as MS4s, thereby bringing them into the regulated program.

Urban and suburban stormwater discharges deliver a significant load of nutrients and sediment to the Bay accounting for approximately 10 percent of nitrogen, 31 percent of phosphorus, and 19 percent of sediment. However, most of the nutrients and sediment discharged to the Bay in urban/suburban stormwater runoff are discharged through stormwater outfalls that are not in designated MS4 areas or represent pre-1986 development and, thus, not specifically regulated by the NPDES program. Only 2 percent of the nitrogen, 6 percent of the phosphorus, and 4 percent of sediment delivered to the Bay through urban/suburban stormwater discharge outfalls are regulated by EPA and the Bay states under the NPDES MS4 program.

The NPDES permitting program requires designated MS4s to develop and implement a stormwater management program to minimize the discharge of pollutants through MS4s. Components of an adequate stormwater management plan include a program to oversee construction activities within the MS4's boundaries. Large and medium MS4 programs must also include a program for overseeing industrial and commercial facilities that have a significant effect on water quality. In the Bay watershed, approximately 450 MS4s exist. Those MS4s are primarily in Maryland, Virginia, and Pennsylvania. When the boundaries of those MS4s are overlain with the maps of watersheds impaired by stormwater runoff for nitrogen and phosphorous, the MS4s along the I-95 corridor in these states stand out as appropriate areas for further compliance monitoring and enforcement efforts. EPA's Chesapeake Bay Program Office is evaluating additional data, which will allow EPA to identify priority watersheds with greater precision and specificity.

EPA does not have national data on MS4 noncompliance. Much of the information regarding compliance comes from audits and inspections and discussions with the states concerning problems identified in the field. While results have been mixed across EPA Regions, many Regions have found deficient municipal stormwater management programs, particularly in regard to MS4 stormwater construction oversight programs and the MS4's ability to assess the adequacy of stormwater management practices in protecting water quality standards.

Permit quality has been a continuing concern for MS4 enforcement efforts. For example, some NPDES permits for MS4s do not contain adequate and/or clear and enforceable performance standards for developing and implementing municipal stormwater programs. Poorly written permits make it difficult to use EPA or state CWA enforcement personnel to identify and require necessary improvements to remedy deficient programs. EPA's Office of Enforcement and Compliance Assurance has provided EPA's Office of Water with feedback concerning permit quality problems observed nationwide related to enforceability. The Office of Water has initiated

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efforts to improve permit quality and some of the larger MS4s are now on their second or third permit cycle with successively improved permits.

Construction sites and industrial facilities are both within MS4s and outside MS4 boundaries. Activities at industrial facilities, such as industrial processes and material handling and storage, are often exposed to precipitation. As stormwater or snowmelt discharges come into contact with such activities or with the raw and processed materials associated with the activities, pollutants are transported to nearby storm drains or directly to surface waters. Pollutants in stormwater coming into contact with industrial activities and materials likely include total suspended solids, oil and grease, and chemical and/or biological oxygen demand. Concrete and asphalt operations, such as ready-mix concrete facilities, and mineral extraction have been identified as industrial stormwater potential sectors of concern in the Bay.

The construction sector is one of the 10 industrial sectors regulated under the NPDES program for industrial stormwater discharges. Clearing, grubbing, grading, and other construction activities disturb and expose the soil surfaces, allowing significant amounts of sediment transport through stormwater runoff into storm drains and other discharge points into waterbodies. In addition, the loss of vegetation, soil compaction, and increases in the amount of impervious surfaces result in increased stormwater flow amounts and velocity. Such increases, in turn, contribute to streambed and bank scour and erosion, channel widening, and stream bank undercutting, which increase the amount of sediment discharged to the Bay.

Much of the recent residential construction in the greater Chesapeake Bay watershed has occurred in and around the population centers of York, Pennsylvania; Baltimore, Maryland; Washington, D.C.; Wilmington, Delaware; and Richmond, Virginia. Data provided by Bay states under CWA section 303(d) suggests that waterbodies impaired by sediment in the Chesapeake Bay watershed are concentrated in these areas as well. As such, the primary priority watersheds for construction stormwater discharges are those watersheds where waterbodies are both impaired for sediment and current data projects high population growth rates. These watersheds form the basis for targeting efforts using construction permit information, state transportation plans, EPA audits of state programs, citizen tips, and other relevant sources of information. Additional watersheds might be added to the priority watershed list on the basis of factors such as high population growth rates (where receiving waters are not yet identified as impaired for sediments), severe impairment (where projected population is not particularly high), or the presence of large construction projects or industrial sites with the potential to discharge large quantities of pollutants in stormwater discharges. The priority watershed list will also be the basis for identifying major industrial sites in the priority industrial sectors for compliance inspections.

b. Goal

EPA is preparing to focus its stormwater noncompliance enforcement efforts on MS4s, construction activity, and priority industrial sectors within the geographic priority areas. EPA and the Bay states would address all MS4s with deficiencies that are clear violations and that are within the identified geographic priority areas, and where program deficiencies could significantly affect Bay water quality. Where vague and poorly written or inadequate permits hamper the use of enforcement tools to address potential deficiencies, EPA plans to provide compliance assistance to encourage MS4s to improve municipal stormwater management plans and coordinate with permitting staff to improve and strengthen subsequent permits. The primary goals associated with construction sites and other priority industrial sectors are generally dependent on whether these sites and facilities are within or outside designated MS4

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boundaries. The primary goals are (1) to gather data to support designating unregulated priority urban/suburban separate storm sewer systems for NPDES coverage; (2) to improve MS4's municipal stormwater management programs and/or encourage stronger oversight and enforcement of applicable requirements for construction sites by other local authorities such as soil conservation districts; and (3) to increase the visibility and showcase the importance of strong, effective MS4 stormwater management programs in improving water quality. EPA will also continue to inspect and take appropriate enforcement action against discharges from noncompliant construction site operations and other industrial facilities in identified priority watersheds.

iv. Air Deposition

a. Overview

EPA will protect the Chesapeake Bay by targeting enforcement actions at sources in the Chesapeake Bay airshed, which includes Pennsylvania, West Virginia, Virginia, Maryland, Delaware, New York, North Carolina, South Carolina, Tennessee, Kentucky, Indiana, Michigan, Ohio, New Jersey, and the District of Columbia. EPA will focus on achieving reductions in NO_x to reduce nitrogen loading to the Bay.

Enforcement actions designed to reduce nitrogen deposition to the Chesapeake Bay could also result in substantial reductions in sulfur dioxide, mercury, and other pollutants if the Agency and its state partners are successful in obtaining binding commitments from utilities and other sources to install pollution-control technologies. Such additional pollution reductions, in turn, could yield significant public health and welfare benefits, including reduced respiratory problems and fewer fish consumption advisories.

Nitrogen emissions from sources within the Chesapeake Bay airshed contribute approximately 75 percent of the nitrogen deposition to the Bay watershed. The remaining 25 percent of the nitrogen deposition is from long-range transport of emissions from sources outside the airshed, including emissions from portions of southeastern Canada. Of the inorganic nitrogen deposited to the Chesapeake Bay watershed from air emission sources, approximately 67 percent is from air emissions of NO_x. The remaining 33 percent is from emissions of ammonia (NH₃). The contributions from any single facility in the long-range emissions transport category are unlikely to be significant. Sources of NO_x include electric generating units, other industrial stationary sources, on- and off-road mobile sources (cars, trucks, ships, tractors), lightning, and soil. Sources of ammonia include AFOs, fertilized fields, mobile sources, and industrial stationary sources.

b. Goal

The goal is to reduce nitrogen air deposition by addressing noncompliance with existing air pollution control requirements. Coal-fired power plants, acid, glass, and cement manufacturing are already national enforcement priorities for the Agency because of the substantial emissions of NO_x and other pollutants from those industries. Since 1999 EPA has pursued a coordinated, integrated compliance and enforcement strategy to address CAA New Source Review compliance issues at the nation's coal-fired power plants. Many of these cases have already resulted in settlements that will reduce nitrogen deposition to the Bay, such as the settlement with American Electric Power, which when fully phased in, will reduce NO_x emissions from the company's power plants in the Chesapeake airshed by more than 150,000 tons per year. EPA also intends to seek additional NO_x reductions through enforcement of New Source Performance Standards (NSPS) and SIP provisions governing NO_x emissions. EPA will continue to vigorously

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pursue these priorities but with a new emphasis on sources that contribute to nitrogen pollution in the Bay. To achieve this goal EPA will (1) seek reductions from stationary sources of NO_x emissions by enforcing New Source Review, NSPS, and SIP requirements pertaining to NO_x emissions and obtaining either judgments or enforceable settlement agreements to install pollution control technology and incorporate best management practices to achieve NO_x emissions reductions; and (2) seek reductions from mobile sources of NO_x emissions by enforcing mobile source regulations at port facilities, warehouses, and construction sites.

v. Toxics Cleanup

a. Overview

In addition to nutrients and sediments other serious contaminants are negatively affecting water quality in the Bay, such as PCBs; PAHs ; and metals—such as mercury, endocrine disruptors, and pesticides. The U.S. Geological Survey estimates that 72 percent of the Bay segments are impaired by contaminants. Such contaminants can leach into the groundwater or directly into the Bay from sources in the watershed, such as industrial facilities, hazardous waste sites, landfills, urban stormwater runoff, and mobile and stationary air sources.

b. Goal

EPA will look broadly at the sources of toxic contamination to the Bay and work with the states and other federal agencies to reduce the effect of hazardous substances on the Bay.

In particular, EPA will focus on toxics in three geographic areas in the watershed and closely tied to the Bay: (1) the Elizabeth River; (2) the Anacostia River; and (3) Baltimore Harbor/Patapsco River. Those areas have been identified as the waters most affected by toxic contaminants and contain current and/or historical RCRA facilities, federal facilities, and Superfund sites. EPA will use Superfund and RCRA authorities and partner with other federal departments/agencies and states. We will seek to access and leverage resources, authorities and compliance and enforcement strategies to address contaminants in these three areas. Over time, EPA will continue to look for opportunities to use its Superfund and RCRA corrective action authorities to address sources of hazardous substances within the Bay watershed.

In addition, actions taken in other parts of this strategy are likely to have a concomitant impact on toxics in the Bay. For example, air enforcement actions designed to reduce nitrogen deposition to the Bay could also result in reductions in mercury; improvements in wastewater treatment and MS4 permits, facilities, and practices could also result in reduced toxics; and better management of chicken litter from CAFOs could reduce the amount of arsenic entering the Bay. Finally, ongoing efforts to reduce toxic contaminants entering the Bay and its tributary waters, for example, for new TMDLs for local streams and larger-scale TMDLs for listed chemical impairments (e.g., PCBs in the Potomac Basin) will also have a positive effect on toxic levels in the Bay. EPA will continue to look for opportunities to address nutrients, sediments, and contaminants together.